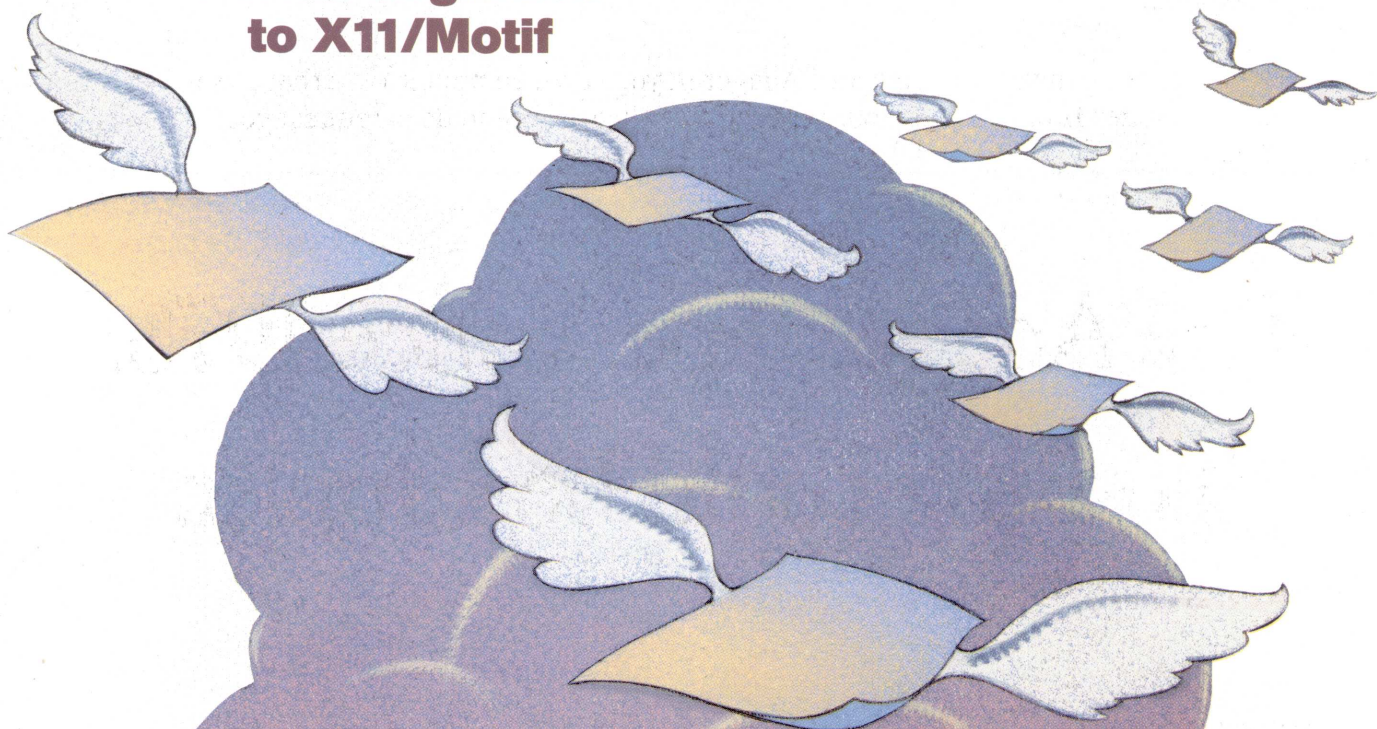


hp·ux / usr

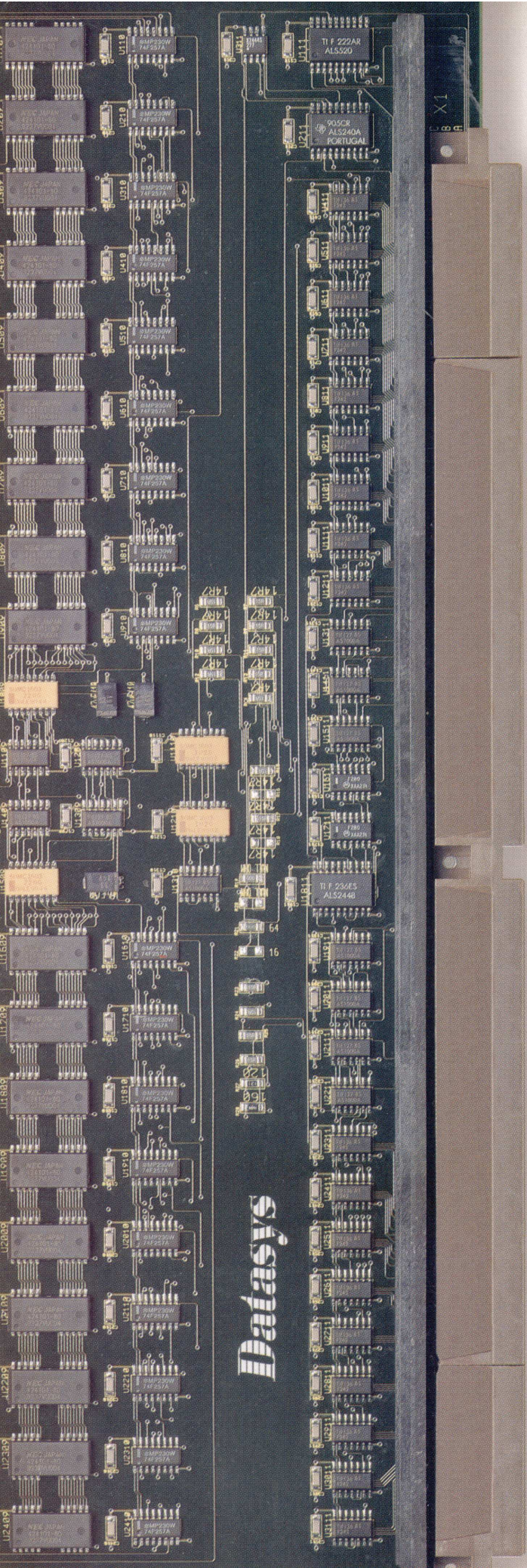
Hands-On Solutions for HP-UX Users • May 1993

Forms Migration to X11/Motif



Hewlett-Packard Remote Watch
Expanding the Capability of an HP-UX Network

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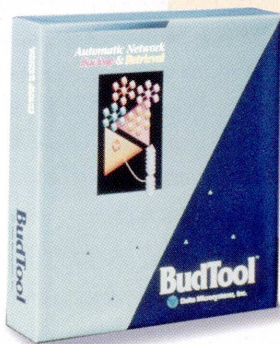
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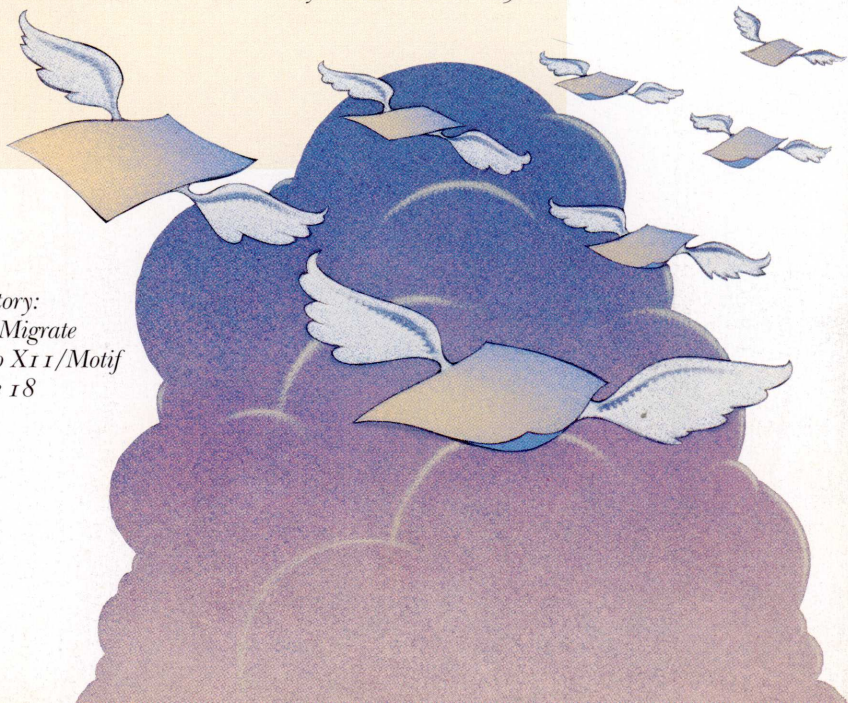
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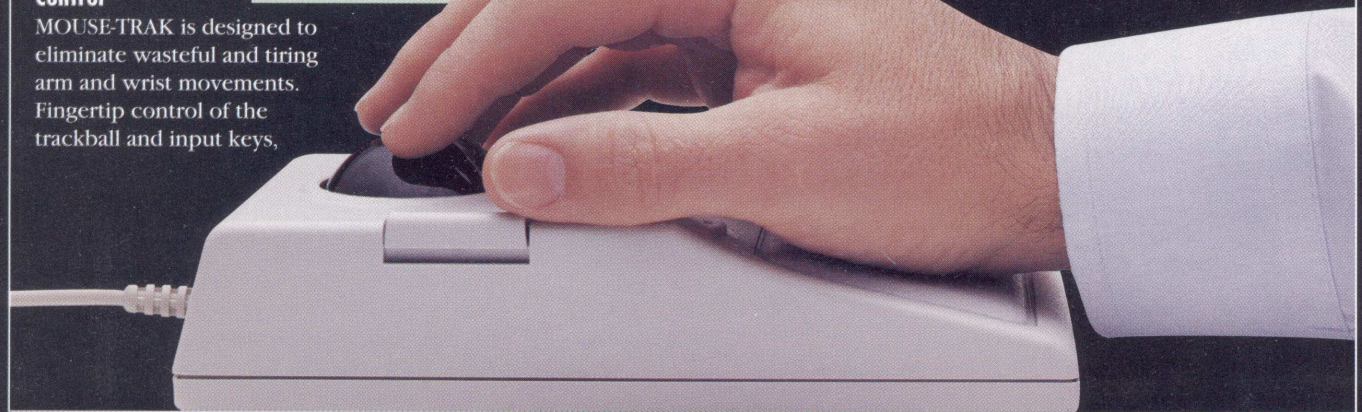
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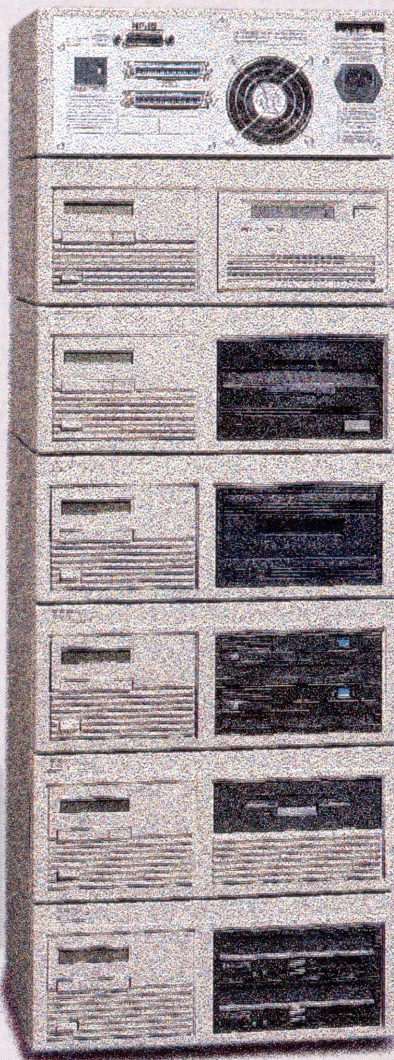
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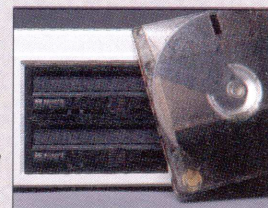


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Question & Answer

Q: How can I find all my device files?

A: Often you may need to locate a device file but are unsure of the name or directory location. While lssf does provide the needed ability to decode the device file, a recursive list of files in subdirectories is not an option for lssf. In this case, we must supply the list from the find command as in (note the grave accent ` character):

```
/etc/lssf `find /dev -type c -print`
```

which finds all character (raw) mode device files in /dev and any lower directory. If you need to locate a specific hardware path to locate a device file, add the grep command as in:

```
/etc/lssf `find /dev -type c -print`|grep 52.6
```

which will locate any device file with a hardware path of 52.6. To find block devices (i.e., mountable disks with filesystems) use the -type b option instead of -type c. Multiple -type options may not be combined in the find command. However, multiple finds may be placed on the same line as in:

```
/etc/lssf `find /dev -type b -print` `find /dev -type c -print`
```

and that will find every device file in every /dev directory. To find a particular disk, you can specify the hardware path as part of a grep string or you can list all the disk device files in every directory by specifying a disk-unique string like s15 which appears at the end of every device fileset created for a disk.

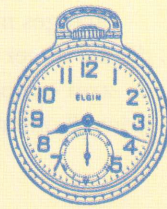
By specifying s15 and not something like d0, you can ensure that only one section per disk will be found, which significantly reduces the size of the listing.

Note that the list for lssf to process comes from the find command(s) and this might possibly exceed the limit for items in the lssf string, so you may need to limit the search to specific directory. In this case, the normal lssf command form can be used as in:

```
/etc/lssf /dev/*
```

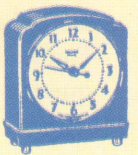
In this case, lssf will complain about directories within /dev that are not device files, but these can be ignored.

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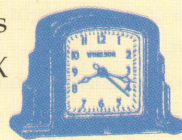
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CIRCLE 02 ON READER CARD

Q: Lrom reports:

```
Cannot convert string "variable" to type
                                FontList.
```

A: When starting lrom, the program reports the error:

```
Warning: Cannot convert string "variable" to
                                type FontList
```

or

```
Warning: Cannot convert string "courr18" to
                                type Font
```

or similar error. The problem is that the Xserver, that is, the LaserROM screen, does not have the fonts listed in the error message installed or available.

The X Windows system is a client-server design in which a client is the program running the executable code, and a server or display server is the location where the window is shown. Fonts must be installed on the display server to match the requested fonts from applications on the client system.

For LaserROM, the default fonts are:

```
LRom*fontList: variable
courr18Rom*Font:
```

Other fonts may be specified that match the display server. For example, the font helvb14 is preferred since it maps the underscore character correctly, rather than as a left-pointing arrow. The font courr18 may be too large for medium- or low-resolution displays so fonts such as courr14 might be used.

Here are the uses for each font:

*LRom*fontList*: Menu labels, buttons, database names, everything except the text of a document. This font will tend to control the overall size of the windows. This font can be proportionally spaced and looks best with a sans serif style. *LRom*Font*: Reader window text from documents. This font must be fixed spacing to maintain aligned columns of text.

The font resources are requested by the client program and it is up to the display server to provide the named fonts. Since X display servers might be located on non-HP platforms such as PCs or other UNIX-style boxes, support for fonts is a combination of what is available on the display server and what is declared to the lrom program through X resources.

Lrom X resources can be declared explicitly in the run string using the -xrm option, through .Xdefaults or .xrdb files in the display server \$HOME directory, or in the global lrom resource file:

```
/usr/lib/X11/app-defaults/LRom
```

Changes made to the LRom file will affect all users on a display server unless explicitly overridden by .Xdefaults, .xrdb or -xrm options—in that order. -xrm in the run string overrides all other settings in the X environment.

Q: How do I set my terminal type in an easier manner?

A: For 8.0 and higher systems only. Setting the terminal type has been a mystery due to the cryptic interface and options for tset. At 8.0 the new command ttytype has been added. Although this name is the same as a file in /etc, there is a separate man page for each (man 1 ttytype, man 4 ttytype).

ttytype will identify most common HP and non-HP terminals by using special inquiry strings. Here is a sample setup:

```
# Setup the login terminal
# =====
#
eval `ttytype -s`
stty erase "^H" kill "^U" intr "^C" eof "^D"
if [ -x /usr/bin/tabs ]
then
    tabs
else
    echo "The command \"/usr/bin/tabs\" was not
                                found."
fi
export TERM
```

This should be a lot more versatile and simpler than previous methods.

Q: How can I recreate /etc/ioconfig?

A: For 8.0 and higher, 800 series systems only. The file /etc/ioconfig contains a description of the I/O devices and

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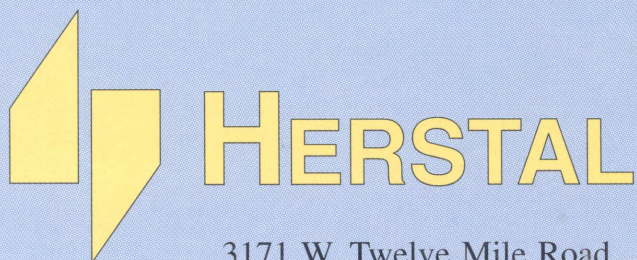
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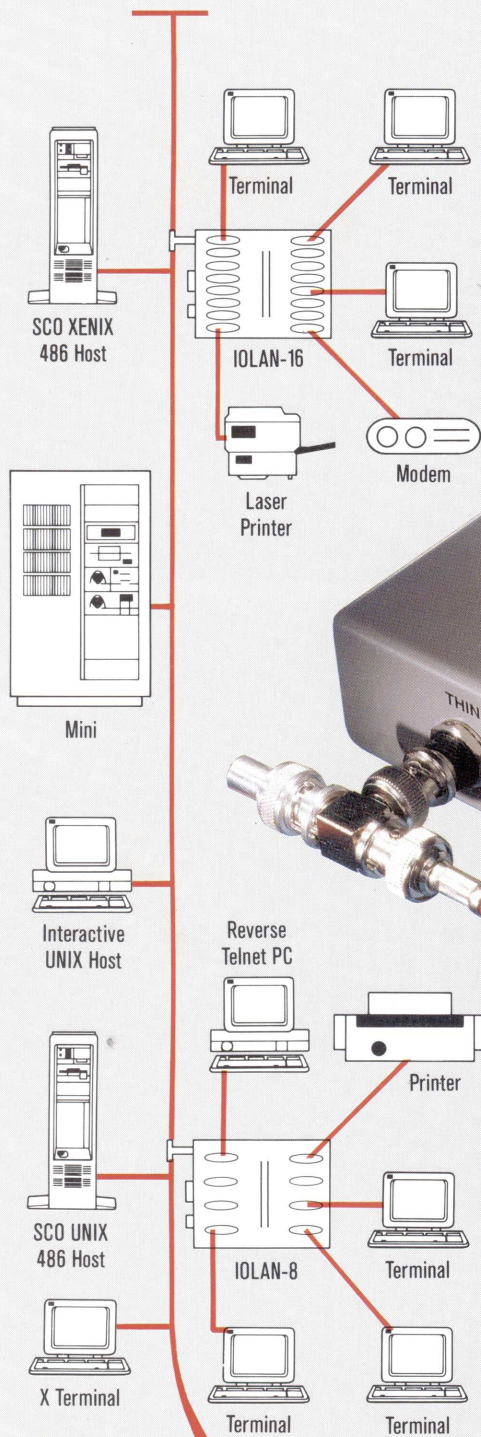
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associated drivers. When it becomes corrupted, `rmsf` and `insf` may not operate correctly. There are several techniques that can be used to recreate this file.

The file `/etc/ioconfig` is a map of the LUs, their corresponding drivers, and the hardware path, which if corrupt or missing, will not allow the system to boot properly.

At 8.0, `/etc/newconfig` has a copy of an empty `ioconfig` file—it is not zero-length but must be four bytes long containing `!"10` with no other text including a newline character. Restoring the `ioconfig` file is as simple as copying the reference version from `/etc/newconfig`.

However, at 8.02, the file was not included with `/etc/newconfig`, so another alternative is to rebuild the file by hand using the command:

```
echo '!!"10\c' > /etc/ioconfig
```

The apostrophe is required because of the double quote char that is in the string, and that `\c` is required to suppress the newline character.

However, the easiest way (in every 800 series revision from 8.0 through 9.0) is to use the `/etc/ioinit` command with option `-cf`, which will recreate the file and add every device currently known to the kernel. If `/etc/ioconfig` is corrupt, be sure to remove the file completely and then run `ioinit` to remake the `ioconfig` file. This may be done on a running system.

If `ioinit` is run with option `-cfi` then missing device files will be created. This applies to all devices EXCEPT logical volumes. LVM recovery requires the use of the LVM commands!

Note: The `/etc/checklist` file and `getty`'s in `/etc/inittab` may need to be edited since this procedure builds the device files in hardware order. That means that the old device file names may not be the same (they'll have a different LU number).

Q: Why does ping return more packets than sent (negative loss)?

A: `ping` returns more packets than sent, which usually produces a message like:

```
2 packets transmitted, 6 packets received,
-300% packet loss
```

This is usually due to a duplicate IP address on the network. When this happens, other network services will fail or have erratic problems.

Q: After updating to 9.0, bootpd doesn't work.

A: After an upgrade to 9.0, JetDirect printers no longer get downloaded. From the `/usr/adm/syslog` file:

```
.... bootpd[1094]: request from hardware
                        address 08000922B509
.... bootpd[1094]: found 15.17.40.170 lj1a
.... bootpd[1094]: vendor magic field is
                        99.130.83.99
.... bootpd[1094]: sending RFC1048-style reply
.... bootpd[1094]: ioctl(SIOCSARP): Can't
                        assign requested address
```

The problem is due to a special version of `bootpd` distributed with the X/terminal software. For 9.0, reload the program `/etc/bootpd` from the 9.0 HP-UX update. It works correctly for X/terminals as well as for JetDirect devices.

Q: How do I tune the parameter `ncdnode`?

A: When a large number of users (and/or CDROM drives) are running CDROM applications such as Laser-ROM, a console error message:

```
cdnode: table is full!
```

may appear on the console and the applications will begin to fail in reading the CDROM discs. The problem is caused by a hardcoded value of 150 stored in the non-tunable parameter `ncdnode`.

SR 5003094680 has been filed to get the parameter tunable. However, there is a workaround. The parameter `NCDNODE` in the header file `/etc/conf/machine/space.h` is responsible for the size of the `cdnode` array. It can be made tunable with the following steps:

1. Edit `/etc/master` and add the following line:
`tunable ncdnode default 150;`

A good location is following the line:

`tunable nbuf default 0;`

so that the tunable parameters are in alphabetical order.

2. Edit the file `/etc/conf/machine/space.h` and look for the parameter `NCDNODE`, which will look like this:

```
/*The NCDNODE should be defined in master for
                                configurability.
Before we can actually do it, this is what we
                                can do now.*/
#define NCDNODE 150
```

Change the `#define` to a comment and add the line below:

```
/* #define NCDNODE 150 */
int ncdnode = NCDNODE;
```

3. Now the parameter `ncdnode` is tunable in the S800 file. Each `cdnode` increases the in-core table size by 300 bytes. Usually, doubling an exceeded value is sufficient for moderately growing systems. `ncdnode` at 150 (the default) was exceeded on a system with 6 CDROM drives, and approximately 50 copies of LaserROM running at the same time.

SAM will not be able to change parameters for current revisions of HP-UX so this must be manually adjusted in the S800 file until a patch is released.

Q: How can I monitor the console messages in a file?

A: The command `/etc/dmesg` may be used to view the current message buffer where console messages are kept. This buffer is circular such that older messages will scroll off the top. To monitor (and log) data that has been added to the message buffer while running, `/etc/dmesg` has an option to 'remember' what additions have been made recently.

The command `/etc/dmesg -` (just the minus character) will report all the differences between the first `/etc/dmesg -` command and subsequent runs of the same command. This may be appended to a file for logging and an example of this is provided in `/etc/newconfig/crontab.root`.

Here is an example to log messages using cron:

```
# log kernel diagnostic messages every 10 minutes
05,15,25,35,45,55 * * * * /etc/dmesg -
>>/usr/adm/messages
```

`root` (superuser) may be added to cron with the command:

```
crontab /etc/newconfig/crontab.root
```

To view the latest logged information, the `/bin/tail` command may be used as in:

```
/bin/tail /usr/adm/messages
```

Q: JetDirect: There is no such variable in this MIB.

A: For HP JetDirect LAN card using the TCP/IP protocol for printers and plotters, when running the JetDirect setup, the connectivity test reports back the error:

There is no such variable in this MIB.

This error is produced when using the IP address (or host-name) of a computer and not the JetDirect card. To verify this error, use the command:

```
/usr/lib/hpnp/hpnpstat -I <IP_addr or hostname>
```


The result will look like Figure 1A

FIGURE 1A

Interface	IP address	Network Mask	Network Address	Link Address
HP-NPI	15.17.184.232	255.255.248.0	15.17.184.0	08000926122D

If the hostname/IP address is actually another computer, the result will be similar to Figure 1B.

FIGURE 1B

Interface	IP address	Network Mask	Network Address	Link Address
lan0	15.17.184.29	255.255.248.0	15.17.184.0	0800090123c2
lo0	127.0.0.1	255.0.0.0	127.0.0.0	<none>

Note: JetDirect cards for TCP/IP will always respond with an Interface type of HP-NPI. Notice the "lan0" Interface for a computer.

Bill Hassell, an HP-UX System Support Engineer at the HP Response Center in Atlanta, Georgia, supplies hp-ux/usr with the Center's "most often asked" questions.

HP 9000 Workstations

Q: The RMBUX window on a 700/X terminal improperly prints characters when entered from an ITF keyboard.

A: The "-K {keymap}" option has been added. You can run rmb with:

```
rmb -K ITF
rmb -K PC
rmb -K PC_HIL
```

to force rmb to assume an ITF, PC, or PC/HIL keyboard respectively.

Q: How many panels deep can you build a VEETEST test plan ?

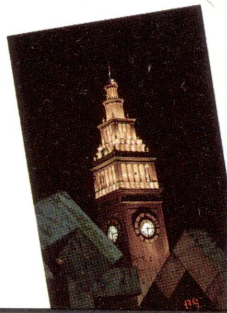
A: VEETEST can stack panels $2^{32}-1$ deep; however, the complexity of such a structure could become unmanageable before this point is reached.

Q: Can I hook up an HP-IB printer to the model E2070A HP-IB interface in my 730? It is currently configured with two different instruments.

A: No. The HP 9000 Device I/O Library (DIL) is not fully implemented on the Series 700. In particular HP-IB support is limited to simple I/O for printers and plotters, and only via the 25560A EISA interface. A Portable I/O Library (PIL) is available as part of HP VEE-test (E2111A), but it supports only the E2070A ISA HP-IB and does not presently support the 25560A EISA interface.

Continued on Page 16

San Francisco Beckons



While attending the 1993 INTEREX HP Computer Users Conference, September 19-23 at the Moscone Center, you'll spend several days in the heart of San Francisco. And most likely, you'll see first-hand why this "City by the Bay" is one of America's favorites.

The key to familiarizing yourself with this city is experiencing its variety—from bustling marketplaces to the serenity of the Japanese Tea Garden or Angel Island, from the ethnically diverse influences found in North Beach to Chinatown—so authentic it seems like its own city within the city. And don't forget those cable cars and the famous Golden

Gate and Bay bridges.

When people envision San Francisco, they often think first of the bay and Fisherman's Wharf. Although the shops along Pier 39, Ghirardelli Square, and the Cannery tend toward the touristy and kitschy, this waterfront area is not to be missed. Pier 39, one of the city's most visited attractions, houses two levels of restaurants and shops. It also features a carousel

and more than 300 sea lions, which have taken up residence on one of the docks. One of the city's bay sightseeing cruise lines, the Blue and Gold Fleet, departs from Pier 39.

Musicians, jugglers, magicians, mimes, and other street entertainers frequently showcase in Ghirardelli Square, site of the Domingo Ghirardelli Chocolate Manufactory from 1863 to the early 1960s.

Chinatown, the largest Asian community in the world outside of Asia itself, consists of 16 square blocks of tearooms, shops, temples, Chinese schools, theaters, and grocery stores. The Chinese Culture Center displays Chinese art and artifacts.

Once the Beatnik haven of the West Coast, the North Beach region, also called "Little Italy," testifies to the city's diversity: North Beach has spawned many cabarets, jazz clubs, coffee houses, delis, and Italian restaurants. Of note is the Buena Vista cafe, home of the original Irish Coffee.

In the downtown financial district you'll find such unique structures as the slender TransAmerica Building, offering a fabulous view from the top and nearby, the ferry building, the original cornerstone of the waterfront.



Photography by Ron Wright



Conference Attendees

Golden Gate Park

One of San Francisco's greatest treasures is Golden Gate Park, a three-mile-long preserve and recreational center. It isn't unusual to see roller bladers, bicyclists, joggers, and casual strollers moving along its many thoroughfares. The park can be an excellent place for people-watching, but it offers more than scenery.

The park's scientific compound is the California Academy of Sciences. It includes Steinhart Aquarium, which houses about 14,000 aquatic animals and offers the adventurous a chance to pet starfish and other sea creatures in the California tide pool. Morrison Planetarium contains a 5,000-pound star projector, a one-of-a-kind instrument under a 65-foot dome. The Natural History Museum houses exhibits on evolution, gems and minerals, various cultures, and even a "moving" exhibit in the Earth and Space Hall, where visitors can experience a simulated California earthquake.

Other favorite spots are the Asian Art Museum, which houses jades, bronzes, ceramics, and paintings throughout Asian art's development, and the M. H. De Young Memorial Museum, displaying American art from colonial time to the 20th century and

ancient arts from Egypt, Greece, Rome, and Africa.

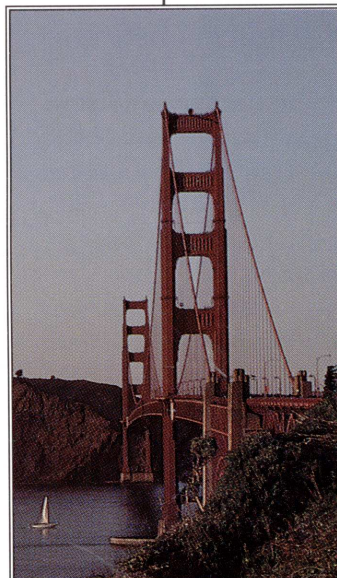
The country's oldest Japanese Tea Garden, with landscaped acres of bridges, walks, ponds, miniature waterfalls, statuary, and pagodas, is a park treasure.

Not far from the park is the elegant Palace of Fine Arts, the last remaining structure of the 1915 Panama-Pacific Exposition. Mirrored by a surrounding lagoon, it is a photographer's dream site.

The Hills

While not the largest of San Francisco's 40 or so hills, Nob Hill affords an impressive view of the bay, the financial district, and Chinatown. Russian Hill overlooks the Golden Gate bridge and Lombard Street, famed as the "world's crookedest."

Telegraph Hill, offering panoramic views of the entire north and east bay, is topped by Coit Memorial Tower, which rises 542 feet above the bay for yet another stunning San Francisco view.



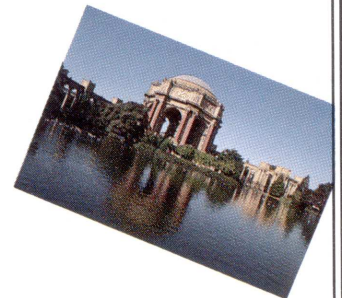
Water Trips

To experience a completely different side of San Francisco, visitors can take a short sightseeing cruise or hop a ferry to Alcatraz, site of the infamous prison, or to the lush and serene Angel Island with miles of pleasant hiking/biking trails.

This is but a cursory introduction to this unique bayside city. The one week of the conference won't allow you enough time to see it all, but you will certainly gain an understanding of why San Francisco is one of America's favorite cities.

We look forward to seeing you in September!

Michelle Pollace



Q: When I try to run LaserRom/UX B00.00 (lrom) from a user window, the Internal Application Error Number 426 comes up. Running this program in a superuser window causes no problems. Running the LaserRom A.01.04 in either type of window works fine.

A: This error usually occurs because the 'lrom' directory in the user's home directory is corrupt. The resolution to the problem is to remove or rename the directory in the user's home directory and reinvoke the 'lrom' command. Reinvoking this command will recreate the directory and resolve the problem.

Q: The new LaserROM program doesn't show any printers to select. Why?

A: After installing the new LaserROM program, selecting a printer from the Printers menu shows only a blank list of printers. The vertical scroll bar shows that there are some entries, but it appears to be blank.

The problem is seen primarily with display servers (the system used to display LaserROM) that are running the HP-UX 7.0 operating system. The LaserROM/UX code must run on an 8.0 or higher system but the display server can run on a 7.0 display server. However, the new X/windows release for 8.0, called R4, does have some incompatibilities with the R3 release, the version available on 7.05 systems (HP 9000 Series 300 and 400).

The incompatibility in this case is that the horizontal scroll bar is positioned to the extreme right, thus showing blanks on the line. By moving the horizontal scroll bar back to the left, the printer names can be seen. This occurs only on start-up of the lrom program. Once the scroll bar has been repositioned, it will stay in the correct location.

lrom now remembers that last selected printer, so there is a low probability that the printer select box will be used from run to run of the lrom program.

Note: lrom (LaserROM/UX version B.00.00) is supported only with X services conforming to Motif R4 standards. Use of X/terminals and/or display servers running R3 code may have other problems which can only be fixed by upgrading to R4 services; LaserROM/UX version B.00.00 HP-UX, all platforms; HP-UX, rev 8.0 and up only (does not apply to 7.0 systems).

Q: Why does character mode LaserROM/UX garble my screen?

A: When using LaserROM/UX in character mode from a terminal window in VUE or X11, moving to the Reader window will cause the display to become quite jumbled. The problem is that the window must be sized to 80x24 like any standard terminal. If the window is resized, the LaserROM/UX program does not use the new ROWS/COLUMNS value and therefore assumes the borders are 80x24 characters.

This is not a defect since the purpose of the character mode interface is to support ASCII terminals. Windows users are encouraged to use the graphical version. If the graphical version does not appear when running LaserROM/UX, then the \$DISPLAY environment variable has not been set. This value can also be set with lrom -display myname:0 where myname is the name of the graphical display CPU.

Q: Why doesn't LaserROM display on my Sun workstation?

A: Although LaserROM/UX is recommended for displays using the Motif standard, users have reported that displays have been obtained with a Sun workstation as the target. Usually, lrom will sit there after the advisory:

```
Checking sunname:0.0 for use as the X Windows
                                display server
```

At this point, the xcheck program is verifying the ability of the Sun workstation as a display server. If you are using OpenView 3.0, it has been reported that OpenWindows bug report #1076332 will cause this delay...after about 20 minutes, lrom will start up. The problem is supposed to be fixed in OpenView 3.0.1.

LaserROM/UX B.00.00 was designed and tested for use with HP-UX systems and is not guaranteed to operate in other environments. The above information is supplied for information only and does not imply HP support for the combination.

Q: I have been consistently having driver loading problems after upgrading VEETEST Release 2.0.

A: Due to inconsistencies across the VEE 1.0/2.0 software, some VEE 1.0 programs may not load under VEE 2.0 if they contain certain instrument drivers. You'll get cautions and error messages and the program will not load successfully.

This problem will occur if two things are true:

1. The user wrote the driver, or the SE/FE/user received from HP updated versions or new versions of driver
AND
2. the user or the SE/FE manually compiled the .id file into a .cid file.

If the user configured VEE to use the .id file so that VEE automatically compiled the .id file to a .cid file, this won't be a problem. (Note that the drivers shipped from HP with the VEE distribution are fine. This notice is only for user-written drivers, and drivers that SE/FEs received separately from the set included with VEE.)

The symptoms of the problems are:

While you are loading the program into VEE 2.0 (B.00.00), you will see:

1. A huge caution box saying that this .cid file was compiled with an old hpidc compiler and is invalid, and please recompile it with the new current hpidc compiler. You may also see:
2. An error message saying end of file was found.

(Note that VEE 2.01, coming soon, will not give you this erroneous end of file message.)

To remedy this:

1. Recompile your VEE 1.0 instrument driver with the VEE 2.0 ID compiler (hpidc).

Now try again to reload the program into VEE 2.0. If it loads with no problem, you are done (see 'Further Caution' below). If you still get the end of file error message, then:

2. Edit your stored VEE 1.0 ASCII program with some text editor.

Somewhere in the program will be single line that looks like this:

```
(visiblePanels 1 " ")
```

Delete it from the program. (Be careful not to change ANYTHING else during your edit.)

Note: There may be more than one of these lines in your saved file—one per State Driver panel in your program. Many of these lines may be OK. That is, they may load into VEE 2.0 just fine.

The way to tell if the line is OK is to look at what is inside the quotes. See if it looks like valid names or words. For example,

```
(visiblePanels 2 "[a#" " ")
```

doesn't look like valid names.

```
(visiblePanels 2 "MAIN" "MAIN_TOP")
```

has valid names so you can leave this line in.

If there are control characters inside the quotes, or blank spaces, the line is bad and must be removed. For every line you remove you will have the problem described below, so leave in the lines that are OK.

Further Caution

The program (without the visiblePanels lines loaded into VEE 2.0, or with the lines loaded into VEE 2.01) will run and execute exactly as it did in VEE 1.0. But you may notice that if you open a State Driver panel, there are no widgets showing on the panel—the open panel is blank.



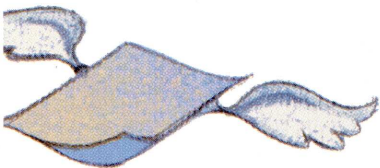

There may or may not be a Reset or Menu component showing, or it may be totally blank. In VEE 1.0, 2.0, and 2.01 the program will still run the same way, but you cannot edit the panels. Even in VEE 1.0, there is no way to edit the panels of these State Drivers. The only solution is to delete the object and replace it with a new one from the menu. ■

Kaushik Mehta of the Hewlett-Packard Response Center in Atlanta, Georgia, answers workstation questions.

by Bob Combs



ILLUSTRATION BY DAVID TILLINGHAST



How to Migrate Forms to X11/Motif

Full-screen forms have been an accepted, even expected, method of user interaction for some years now. It is commonly accepted that forms and windows are the way to provide user friendly features. Using X11 with Motif widgets is currently the most common manner of designing these forms under UNIX systems. But the learning curve for X and Motif is steep. So, let's step through the migration process to convert a form from a serial terminal to an X/Motif environment.

Introduction

Migrating a form application from an ASCII terminal to an X terminal requires a fair amount of X knowledge. Since the learning curve on X is steep, we will cover only enough of X11R4 and Motif 1.1 to migrate a basic form. It really isn't possible to cover in one article what normally takes at least six months to learn.

The approach will be to:

- describe a form, identifying its component parts
- introduce X concepts
- describe the X elements our form will need
- put them all together

Throughout this process we'll review what code will be needed to drive the form.

Form Description

Form applications have been in use for over a decade, closer to two decades. An RS-232-C ASCII "intelligent" terminal that can handle forms has two main features "dumb" terminals lack: protected mode and block reads. The protected mode lets an application set areas that can be typed into (i.e., fields) and areas that are protected from the user. A block read provides the mechanism that allows the computer to request, or the user to send, all of the unprotected data in one transmit block. The unprotected fields only are sent, and are typically separated by some special character so that the program receiving the data can distinguish one field from the next.

We'll refer to these RS-232-C ASCII forms as just ASCII forms to differentiate them from X forms.

Screen

The entire screen serves as the "window" for an ASCII form. Fields and labels may be placed anywhere on the screen.

Fields

A field is a contiguous unprotected text area on the screen. It can be anywhere on the screen and cannot be longer than one line. That is, a field is terminated at the end of a line if not otherwise terminated. The field can be described as the unprotected area between two protected areas. Generally, we think of the entire screen as protected, and the unprotected islands as specific fields.

Labels

Most forms have a label before or after a field to identify its contents. A label is just text in a protected area of the screen. The computer can output the labels, but the user cannot access this area of the screen. Labels are usually part of the form's background template.

Controls

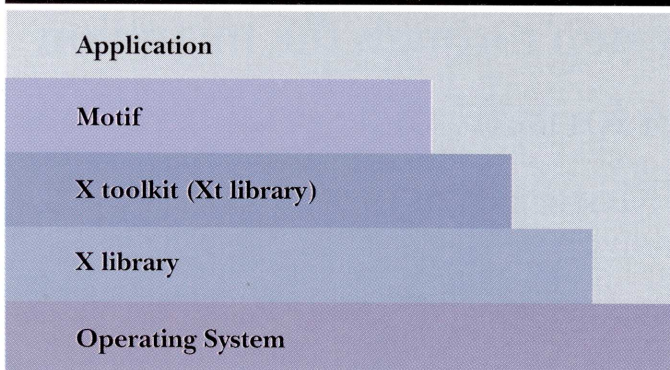
A form application must provide a way for the user to signal that the form is complete and should be read into the computer. This control may be a special character such as control-U, or a special character sequence. Many form applications use a softkey. The softkey generates special escape sequences which the computer can detect. For example, on an HP terminal F1 sends <esc> <p> <cr>. Since softkeys can have, and often do have, labels, the softkey escape sequence is predefined to have a particular meaning such as "Enter," "Next," "Previous," "Help," or "Abort." This allows the users to request various actions on the screen of data they are viewing.

Form Routines

There are several basic functions that must be performed in any forms application to make the form truly useful. These functions provide the ability to display the form, write the field values, read the field values, erase the form, and wait for an operator request. These functions must be accomplished whether the form is ASCII or X.

Displaying the form is probably the most complex function, since it must build the field areas, labels, any additional screen geometry, colors, etc. Screen background templates can be built previously by an editor, or created on-the-fly at execution time, or they can be some hybrid combination of

FIGURE 1



these two. Either way, the display form function will place the form template onto the screen.

A user request routine usually waits for the user to press some particular key sequence, normally a softkey, and returns a value indicating which key or command was requested. In the case of X, event handling will take place in this routine, making it more complex than its ASCII counterpart.

Writing and reading field values is generally performed against specific fields. Due to the nature of ASCII terminals, the entire screen of fields is generally read or written in one block. This requires write screen and read screen routines which transfer the screen fields into or out of a local field buffer. The individual write field and read field routines would then only operate against this in-memory buffer. Note that if the terminal can perform field specific addressing, the buffer and buffer routines are not needed. Each field under X is a separate widget, so field values can be accessed only one at a time.

Erasing the screen implies that the terminal will be placed back in character mode after the screen is erased.

Therefore, the following set of screen functions can be defined:

display	display the form
fieldwrite	write a field value
fieldread	read a field value
getrequest	get a user operation request
erase	erase form

X Introduction

There are several layers of X that we will use for our form. X library is the protocol control layer and the closest connection to the system. The X layer routines usually begin with X; X Toolkit intrinsics usually begin with Xt, and Motif routines usually begin with Xm. Figure 1 shows the general relationship between an X/Motif program and the various layers of the X system. Most of the calls are to Motif routines, with some calls to the Xt toolkit. Most of the calls to X are made by the Motif and Xt routines. X routines are fairly low level, and usually called only to perform functions which neither Motif nor Xt can perform.

Client-Server Model

X programs come in pairs that communicate across TCP/IP (or possibly some other communications medium). There is an X protocol that defines the type and format of transfers that can occur between the pair. The user terminal, since it is capable

FIGURE 2

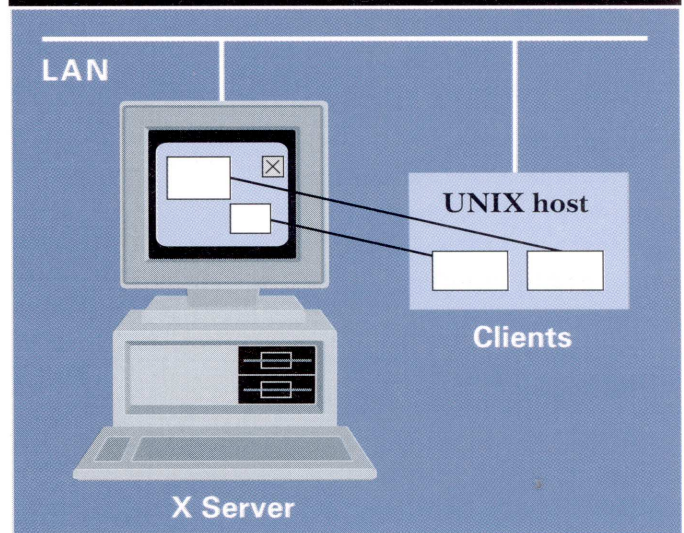
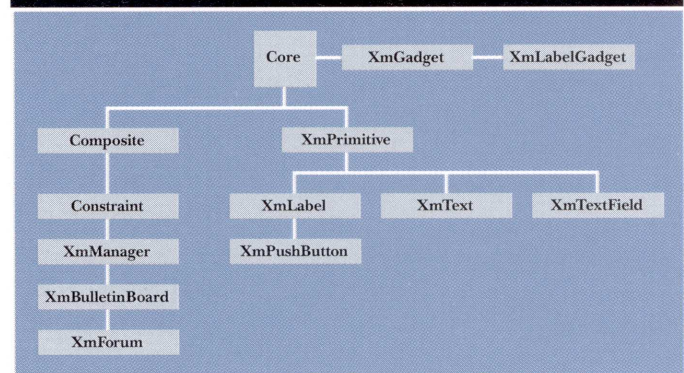


FIGURE 3



of handling multiple programs (windows), is called the X server. The driving programs that run on the UNIX machine are referred to as the clients (refer to Figure 2). Initially this naming seems backwards because of our exposure to file servers, but when viewed in the X model it makes sense. An X server (terminal) may be running multiple X clients, which may be executing from the same or from different UNIX machines.

There is a window manager to regulate the placement of the windows on the screen, control the focus, and give the windows the manager's look by controlling the frame's look. The Motif window manager is called "mwm." The look mwm gives to the frame is the 3-D look that is associated with Motif. Other window managers such as Open Look give the frames and windows a different look. The window which is currently accept-

LISTING 1

```
#ident "@(#)bb.c - bulletin board example"

#include <X11/Intrinsic.h>
#include <X11/StringDefs.h>
#include <Xm/Xm.h>
#include <Xm/BulletinB.h>

/*****
 *   main logic
 *****/
void main (argc, argv)
unsigned int argc;
char **argv;
{
    XtAppContext app_context;
    Arg args [20];
    Widget bb;
    int n;
    XmString string;
    Widget toplevel;

    /* Initialize toolkit and create bulletin board */
    toplevel = XtVaAppInitialize (&app_context, "Example", NULL, 0,
                                &argc, argv, NULL, NULL);

    string = XmStringCreate("bulletin board example",
                           XmSTRING_DEFAULT_CHARSET);

    n = 0;
    XtSetArg(args[n], XmNdialogTitle, string);      n++;
    XtSetArg(args[n], XmNwidth, 200);                n++;
    XtSetArg(args[n], XmNheight, 150);               n++;
    XtSetArg(args[n], XmNresizePolicy, XmRESIZE_GROW); n++;
    bb = XmCreateBulletinBoard(toplevel, "bboard", (ArgList) args, n);
    XmStringFree(string);
    XtManageChild(bb);

    /* Get and dispatch events */
    XtRealizeWidget(toplevel);
    XtAppMainLoop(app_context);
}
```

ing input is said to have the focus. There is only one window and one widget that are actively focused upon at any time. Usually the active window has its frame highlighted.

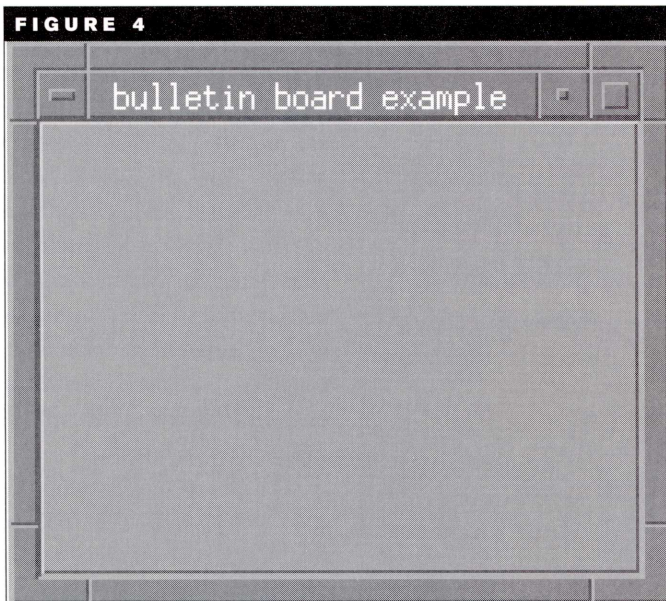
Widgets

The word widget has historically been a slang word meaning "thing." It is generally used when one doesn't know what to call an object. Well, the X folks didn't quite know what to call the functional elemental pieces of X windows, so they used the word widget. It's somewhat difficult to describe a widget. If it were easy, they'd have a better name!

Each widget is a window or subwindow. Widgets may be attached to other widgets. For example, labels are widgets that are attached to a background widget window. Each field is also a widget. So are buttons, menu bars, pull-down panels, and option selections. The frames, colors, shadow thickness, etc. are not widgets; they are called resources.

Gadgets

If we have to have widgets, we have to have gadgets too! A gadget is a special reduced functionality form of a widget. Gadgets consume fewer resources and provide somewhat less functionality. Labels, for example, can be either widgets



or gadgets. When a label is a gadget, it cannot set its own colors as it can if used as a widget. Motif supplies both widget and gadget calls where useful. Background windows or text fields don't have gadget versions; there isn't any use for a gadget version.

Resources

Resources are the characteristics of a window or widget. They include items such as foreground color, background color, xy position, active or inactive shadow colors, frame line thicknesses, and even the text of a field, button, etc. Resources are inherited down the window tree. That is, the window manager (mwm) passes its settings to the application window, and the application passes its settings to the widgets spawned under it.

The default resources can come from an applications default file (like /usr/lib/X11/app-defaults/Example)

or from the command line runstring (\$ bb -bg Yellow), or they can be set directly by the application program. Resources that are not set are either inherited or null. Figure 3 shows a partial inheritance tree for the widgets used in this article.

X Programming

X programming implicitly assumes a firm knowledge of C, X usage, and X terminology. The documentation that must be read to master X/Motif programming is staggering. However, we will cover just enough of the basics to get a form working. There are many embellishments that one may wish to add to a form application. Those will be left to each individual to learn later.

Window

A form will need a window on the X server's display. It is on this background window that all the additional form widgets will be attached. There are two basic widgets that may serve for the form background: Form and BulletinBoard widgets. Of the two, I have chosen the BulletinBoard widget. The reason I did so has to do with the attachment rules. A Form widget allows attaching additional children widgets to its sides, top, or bottom. A BulletinBoard widget allows attaching of children widgets directly to its background using an XY coordinate.

LISTING 2

```
#include <Xm/Label.h>

. . .

Widget lbl1;

. . .

/* Add a label */
string = XmStringCreate("Label-1", XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 10);           n++;
XtSetArg(args[n], XmNy, 17);           n++;
XtSetArg(args[n], XmNlabelString, string); n++;
lbl1 = XmCreateLabel(bb, "label1", args, n);
XmStringFree(string);
XtManageChild(lbl1);

. . .
```


LISTING 3

```

/* Add a label */
lbl1 = XmCreateLabel(bb, "label1", args, n);

string = XmStringCreate("Label-1", XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 10);           n++;
XtSetArg(args[n], XmNy, 17);           n++;
XtSetArg(args[n], XmNlabelString, string); n++;
XtSetValues(args, n);

XmStringFree(string);
XtManageChild(lbl1);

```

LISTING 4

```

#include <Xm/Label.h>
. . .

Widget bb, wa[2];
int n;
XmString string;
int wc;

. . .

/* Add labels */
wc = 0;

string = XmStringCreate("Label-1", XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 10);           n++;
XtSetArg(args[n], XmNy, 17);           n++;
XtSetArg(args[n], XmNlabelString, string); n++;
wa[wc] = XmCreateLabel(bb, "label1", args, n);
XmStringFree(string);

wc++;

string = XmStringCreate("Label-2", XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 10);           n++;
XtSetArg(args[n], XmNy, 52);           n++;
XtSetArg(args[n], XmNlabelString, string); n++;
wa[wc] = XmCreateLabel(bb, "label2", args, n);
XmStringFree(string);

wc++;

XtManageChildren(wa, wc);

. . .

```

Listing 1 is our sample program source code to create and display a solitary BulletinBoard widget window. The include files are required for X intrinsics, X strings, Motif, and the BulletinBoard widget. XtVaAppInitialize performs several X functions: connect to the X display, parse any command line arguments, load resources from defaults file, etc., and create the top-level parent window that will handle all interaction with mwm.

The XtSetArg calls define resource values used for the BulletinBoard widget when it is created by the XmCreateBulletinBoard call. The XmCreateString is used to define a string which is set as the title (by XtSetArg). The memory XmCreateString allocates is released by XtFree after the widget is created.

When a widget is created, it is said to be "instantiated." This is another word the X folks made up. It means that the widget structures have been defined, but not necessarily displayed. Displaying is referred to as "realizing."

After the widget is created, it must be given over to management by X. This is performed by the XtManageChild call.

Once all the widgets have been created and managed, they may be "realized" using the XtRealizeWidget call. This is called for the toplevel shell widget only. All children of the toplevel are then realized.

Finally, XtAppMainLoop is called. This is the event processing loop. The program waits

FIGURE 5

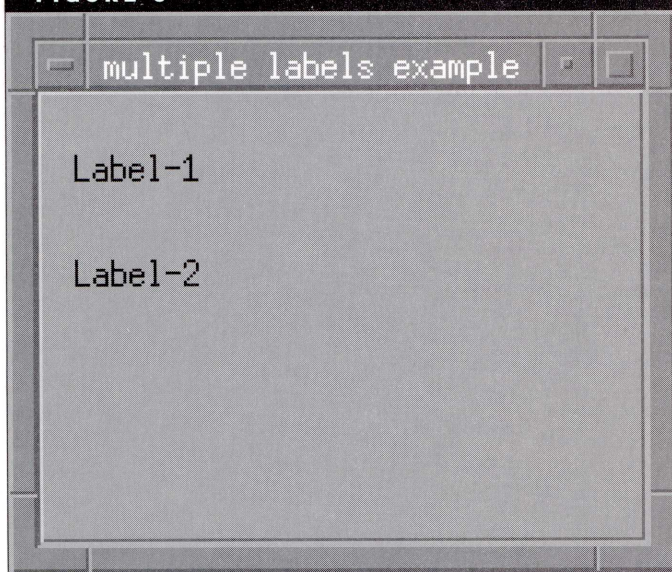
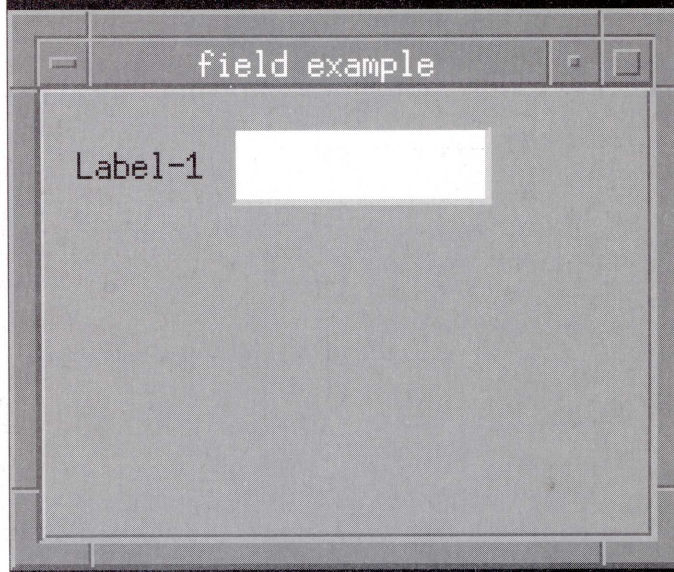


FIGURE 6



in this call for events such as mouse movement, button clicks, and keyboard key presses. Some events are related to actions on other windows, such as exposures.

This program is a full, be it small, operational X/Motif program. Figure 4 is the displayed window resulting from this code.

Labels

Labels are created using the Label widget. Listing 2 shows the code required to add a label.

The text string that will be the label is converted to X-usable format with the XmStringCreate call, and then its memory is released by the XtFree call later. The resources XmNx and XmNy are set to the xy location of the label, as the XmNlabelString is set to the X label text. XmCreateLabel instantiates the label widget.

Widget resources may be set by passing the arguments into a widget creation call or invoked separately using the XtSetValues call. Listing 3 shows an alternative call sequence to Listing 2. Both work

equally well, although Listing 2 may be more efficient.

Listing 4 shows code for adding two labels. Figure 5 shows what the window looks like with the label code added.

Fields

Field widgets are created just like Label widgets. See Listing 5. The resource XmNcolumns defines how many characters

LISTING 5

```
#include <Xm/TextF.h>

. . .

Widget fld1;

. . .

/* Add a field */
n = 0;
XtSetArg(args[n], XmNx, 60);           n++;
XtSetArg(args[n], XmNy, 5);           n++;
XtSetArg(args[n], XmNcolumns, 12);     n++;
fld1 = XmCreateTextField(bb, "field1", args, n);
XtManageChild(fld1);

. . .
```


LISTING 6

```

#include <Xm/PushB.h>

. . .

Widget wa[7];
int wc=0;

. . .

/* Add push buttons */
string = XmStringCreate("Enter",XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 10);           n++;
XtSetArg(args[n], XmNy, 100);          n++;
XtSetArg(args[n], XmNlabelString, string); n++;
wa[wc] = XmCreatePushButton(bb, "btn1", args, n);
XmStringFree(string);

wc++;

string = XmStringCreate("Init",XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 70);           n++;
XtSetArg(args[n], XmNy, 100);          n++;
XtSetArg(args[n], XmNlabelString, string); n++;
wa[wc] = XmCreatePushButton(bb, "btn2", args, n);
XmStringFree(string);

wc++;

string = XmStringCreate("Exit",XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 140);          n++;
XtSetArg(args[n], XmNy, 100);          n++;
XtSetArg(args[n], XmNlabelString, string); n++;
wa[wc] = XmCreatePushButton(bb, "btn3", args, n);
XmStringFree(string);

wc++;

XtManageChildren(wa,wc);

. . .

```


long the field is when displayed. Figure 6 shows the addition of fields.

Buttons

A button is created in a way similar to the creation of Label and Field widgets, and it must also have its action routine defined. Listing 6 shows the code to define Button widgets.

Three buttons are created in Listing 6, each with a different label and at a different position. The buttons will appear on the screen with the labels "Enter," "Init," and "Exit." Another programming concept introduced here is the usage of widget arrays (wa). It is more efficient under X to create multiple widgets, placing them into a widget array, and then managing them all at once with the XtManageChildren call.

Callbacks

What good are the Buttons created in Listing 6 if no event action is defined for each? An action can be defined for an event by defining a Callback. A Callback is a routine that will be executed by X when the described event occurs. The routine performs the action desired for that event.

There are many different types of events, and each widget has a set of events it can invoke through callbacks. However, for tutorial purposes, we will only define a button callback since that is the minimum required to make the form work.

After the Button widgets have been created, callbacks are defined for each. See Listing 7. In each case the event type is XmNactivateCallback. This means the event is activated by clicking the mouse while pointing to that button. There is a separate routine defined for each callback; shown in Listing 8. The fourth parameter is passed to the event when called. The keyword NULL means zero; nothing is passed. The string "Enter button" is passed to the enterCB routine. The field widget pointer fld [0] is passed to the initCB routine. Nothing

is passed to the exitCB routine.

In the enterCB routine, the passed in string is printed and then the value of each field is fetched and printed. Items printed to standard output are displayed in the window that executed the X program. Since many X programs are invoked in the background, it isn't a good idea to use the routine printf as we have here.

The InitCB routine fetches the field text from the passed in widget, displays what it was, and then initialized it to a value of "default."

The exitCB routine terminates the X program. Note that without a button to trigger termination, the window would have to be closed from the X frame function, which is available on each mwm window frame. Not providing an exit function is crude and sloppy.

Putting It All Together

Listing 9 puts all the code pieces of our simple form example together.

The window that Listing 9 generates is shown in Figure 7.

As of X11R4 and Motif 1.1, HP put the new X and Motif versions into directories and left the old version in its original name. Therefore, compiler commands must be given to compile and link using these new directories. A typical makefile then appears as in Listing 10.

X Form Routine Functionality

Coding each form in X is still quite a bit of work. Our company solved the problem by writing an X forms generator that takes care of all the X calls. The form calls were made compatible with the ASCII form calls everyone had been using. Our X forms generator is currently sold as the product Xfrm. Referring to the X programming we have used above, it can be divided into the original routines defined for our simple forms manipulation.

LISTING 7

```
/* Add callbacks for each button press */

XtAddCallback(wa[4], XmNactivateCallback, enterCB, "Enter button");
XtAddCallback(wa[5], XmNactivateCallback, initCB, fld[0]);
XtAddCallback(wa[6], XmNactivateCallback, exitCB, NULL);
```


LISTING 8

```

/*****
 * Enter CallBack
 *****/
void enterCB(w, str, ca_d)
Widget w;
char *str;
caddr_t ca_d;
{
    char *s;
    int i;

    printf("%s was pressed\n", str);

    for (i=0; i<2; i++) {
        s = XmTextFieldGetString(fld[i]);
        printf(" Field %d = %s\n", i, s);
        XtFree(s);
    }
}

/*****
 * Init CallBack
 *****/
void initCB(w, wf, ca_d)
Widget w;
Widget wf;
caddr_t ca_d;
{
    char *s;

    s = XmTextFieldGetString(wf);
    printf("Field-1 was \"%s\", setting field to \"default\".\n", s);
    XmTextFieldSetString(wf, "default");
    XtFree(s);
}

/*****
 * Exit CallBack
 *****/
void exitCB(w, str, ca_d)
Widget w;
char *str;
caddr_t ca_d;
{
    exit(1);
}

```


LISTING 9

```
#ident "@(#)buttons.c - buttons example"

#include <stdio.h>
#include <X11/Intrinsic.h>
#include <X11/StringDefs.h>
#include <Xm/Xm.h>
#include <Xm/BulletinB.h>
#include <Xm/Label.h>
#include <Xm/TextF.h>
#include <Xm/PushB.h>
Widget fld[2];          /* global field widget array */
/*****
 * Enter CallBack
 *****/
void enterCB(w, str, ca_d)
Widget w;
char *str;
caddr_t ca_d;
{
    char *s;
    int i;

    printf("%s was pressed\n", str);

    for (i=0; i<2; i++) {
        s = XmTextFieldGetString(fld[i]);
        printf(" Field %d = %s\n", i, s);
        XtFree(s);
    }
}
/*****
 * Init CallBack
 *****/
void initCB(w, wf, ca_d)
Widget w;
Widget wf;
caddr_t ca_d;
{
```

LISTING 9 CONTINUED
ON NEXT 3 PAGES

LISTING 9 (CONTINUED)

```

    char *s;

    s = XmTextFieldGetString(wf);
    printf("Field-1 was \"%s\", setting field to \"default\".\n",s);
    XmTextFieldSetString(wf, "default");
    XtFree(s);
}
/*****
* Exit Callback
*****/
void exitCB(w, str, ca_d)
Widget w;
char *str;
caddr_t ca_d;
{
    exit(1);
}
/*****
* main logic
*****/
void main (argc, argv)
unsigned int argc;
char **argv;
{
    XtAppContext app_context;
    Arg args [20];
    Widget bb, wa[7];
    int n;
    XmString string;
    Widget toplevel;
    int wc;

    /* Initialize toolkit and create bulletin board */
    toplevel = XtVaAppInitialize (&app_context, "Example", NULL, 0,
                                &argc, argv, NULL, NULL);
    string = XmStringCreate("buttons example",
                           XmSTRING_DEFAULT_CHARSET);

    n = 0;
    XtSetArg(args[n], XmNdialogTitle, string);          n++;
    XtSetArg(args[n], XmNwidth, 200);                    n++;
    XtSetArg(args[n], XmNheight, 150);                   n++;
    XtSetArg(args[n], XmNresizePolicy, XmRESIZE_GROW);   n++;
    bb = XmCreateBulletinBoard(toplevel, "bboard", (ArgList) args, n);
    XmStringFree(string);
    XtManageChild(bb);
}

```

display

The display function must define the background screen as it does in ASCII forms. Under X, display should initialize the display, create the bulletin board window, create each of the widgets, define any callbacks needed, call to manage the widgets, and realize the widgets. This is most of the X program, but it isn't all of it.

getrequest

The getrequest function contains the event and dispatch processing (XtAppMainLoop). The buttons must set a value that can be returned to the caller to indicate which button was pressed.

This can be accomplished several different ways. One way is to use XtAppNextEvent and XtDispatchEvent instead of the XtAppMainLoop call. This expansion allows testing the external button_pressed variable. Each button's callback must set a different value in the button_pressed variable which getrequest will see and exit back to the caller, returning the button number pressed. Listing 11 contains an example of the getrequest code.

fieldwrite and fieldread

Text field values are read or written using the fieldwrite and fieldread functions as access to XmTextSetString and XmTextGetString calls. Any numeric to text conversion can be performed by the field routines before or after calling the respective XmText routine. Don't forget to XtFree any XmString the routines create.

erase

The erase function usually just exits the program. But it may be required to end only the window and allow the program to continue executing, possibly to create another window. In this case, erase will need to call XtDestroyWidget for the top-level widget. This recursively destroys all children of toplevel. Note that callbacks for the destroyed widgets are also destroyed, but any allocated memory is not returned. This must be done explicitly with XtFree calls. ■

Article continued on Page 33.

LISTING 9 (CONTINUED)

```

/*      Add labels */
wc = 0;

string = XmStringCreate("Label-1", XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 10);                n++;
XtSetArg(args[n], XmNy, 17);                n++;
XtSetArg(args[n], XmNlabelString, string);   n++;
wa[wc] = XmCreateLabel(bb, "label1", args, n);
XmStringFree(string);

wc++;

string = XmStringCreate("Label-2", XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 10);                n++;
XtSetArg(args[n], XmNy, 52);                n++;
XtSetArg(args[n], XmNlabelString, string);   n++;
wa[wc] = XmCreateLabel(bb, "label2", args, n);
XmStringFree(string);

wc++;

/*      Add fields */
n = 0;
XtSetArg(args[n], XmNx, 60);                n++;
XtSetArg(args[n], XmNy, 5);                n++;
XtSetArg(args[n], XmNcolumns, 12);          n++;
XtSetArg(args[n], XmNvalue, "no data");      n++;
wa[wc] = XmCreateTextField(bb, "field1", args, n);
fld[0] = wa[wc];

wc++;

n = 0;
XtSetArg(args[n], XmNx, 60);                n++;
XtSetArg(args[n], XmNy, 45);                n++;
XtSetArg(args[n], XmNcolumns, 12);          n++;
XtSetArg(args[n], XmNvalue, "none");         n++;
wa[wc] = XmCreateTextField(bb, "field2", args, n);
fld[1] = wa[wc];

wc++;

```


LISTING 9 (CONTINUED)

```

/*      Add push buttons */
string = XmStringCreate("Enter", XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 10);                n++;
XtSetArg(args[n], XmNy, 100);                n++;
XtSetArg(args[n], XmNlabelString, string);    n++;
wa[wc] = XmCreatePushButton(bb, "btn1", args, n);
XmStringFree(string);

wc++;

string = XmStringCreate("Init", XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 70);                n++;
XtSetArg(args[n], XmNy, 100);                n++;
XtSetArg(args[n], XmNlabelString, string);    n++;
wa[wc] = XmCreatePushButton(bb, "btn2", args, n);
XmStringFree(string);

wc++;

string = XmStringCreate("Exit", XmSTRING_DEFAULT_CHARSET);
n = 0;
XtSetArg(args[n], XmNx, 140);                n++;
XtSetArg(args[n], XmNy, 100);                n++;
XtSetArg(args[n], XmNlabelString, string);    n++;
wa[wc] = XmCreatePushButton(bb, "btn3", args, n);
XmStringFree(string);

wc++;

XtManageChildren(wa,wc);

/*      Add callbacks for each button press */
XtAddCallback(wa[4], XmNactivateCallback, enterCB, "Enter button");
XtAddCallback(wa[5], XmNactivateCallback, initCB, fld[0]);
XtAddCallback(wa[6], XmNactivateCallback, exitCB, NULL);

/*      Get and dispatch events */

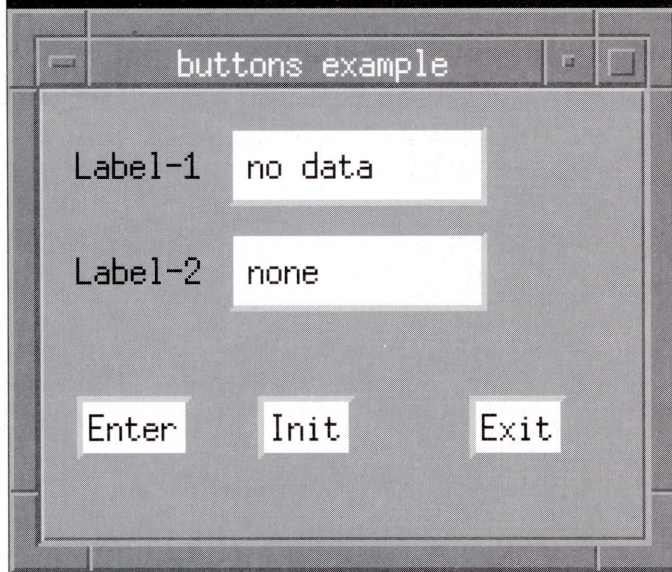
XtRealizeWidget(toplevel);

XtAppMainLoop(app_context);

}

```


FIGURE 7



LISTING 11

```
int getrequest()
{
    XEvent event;

    while (!button_pressed) {
        XtAppNextEvent
            (app_context, &event);
        XtDispatchEvent (&event);
    }
    return (button_pressed);
}
```

LISTING 10

```
# make examples 7 May 1993

CFLAGS = -g -I/usr/include/Motif1.1 -I/usr/include/X11R4 \
        -L /usr/lib/Motif1.1 -L, /usr/lib/X11R4

# if any sources were FORTRAN we'd need the following flags:
# FFLAGS = -Wl,-L,/usr/lib/Motif1.1,-L,/usr/lib/X11R4

LDFLAGS = -LXm -LXt -LX11 -LPW

PROGS = bb label labels field fields buttons

all: ${PROGS}
```

REFERENCES

X Window System (2nd Edition), by Robert W. Scheifler and James Gettys; Digital Press; 1990.

OSF/Motif Programmer's Reference (Release 1.1), by Open Software Foundation; Prentice Hall; 1991.

OSF/Motif Programmer's Guide (Release 1.1), by Open Software Foundation; Prentice Hall; 1991.

Motif Programming Manual (Volume Six), by Dan Heller; O'Reilly & Associates, Inc; 1991.

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Expanding the Capability

of an HP-UX
X.25 Network

by Andres Llana, Jr.



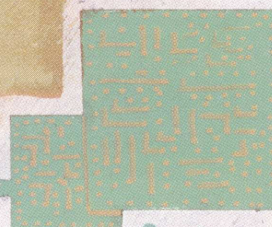
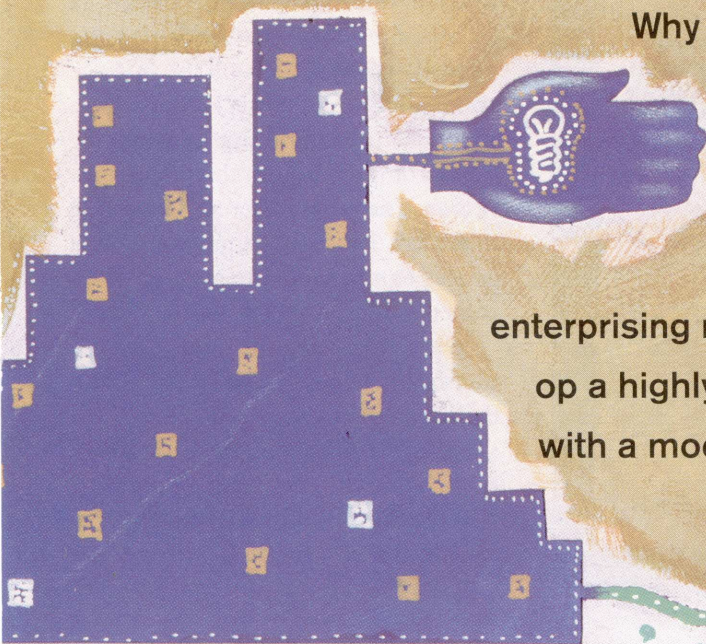
Bringing together
dissimilar network envi-
ronments can wreak havoc

on the unprepared network manager. Often a merger can force a company to spend far more on merging multi-protocol networks than they might had they been positioned to do so from the start. For some network managers, the X.25 networking capabilities of their HP-UX networks have allowed them to sidestep the added costs of integrating such foreign network entities. However, network managers should look beyond the simplistic process of linking remote sites and examine carefully the expanded application of their data networks.

Why not use the bandwidth

supporting data transport
to integrate voice, fax,
and video? Herein lies a
golden opportunity for

enterprising network managers to devel-
op a highly flexible network strategy
with a modest increase in cost!



A Moving Target

Frequently when there is top-down management control and reporting, star configured networks of the type shown in Figure 1 will emerge. Such is the case of this chemical products conglomerate with locations scattered across the United States and Canada. Originally their network consisted of nine locations with centralized reporting through one location. As the company moved through several acquisitions, the network expanded into an international network comprising over 32 nodes. During this period, the company acquired multiple IBM AS/400 and IBM 36/38 computer centers, some of which have since migrated to HP 9000/800 platforms. Communication between all sites is over a private X.25 network utilizing the X.25 9000 link (port) on each HP-UX computer. Figure 1 shows the corporate hub and each of the divisional "smart" locations equipped

with HP 9000/800 computers. The remote plants comprising the remaining network nodes are not shown.

Note in Figure 1 that multiple 9.6-KBPS circuits are used to link each remote computer to the hub platform shown in the right hand portion of the diagram. In this design, no consideration was given to the transmission of voice/fax over the data network as a means to offset costs for voice/fax transmission between operating units. This company spends slightly more than \$435,000 a year for data, and over \$1.5 million for voice/fax communications. Approximately 15 percent of the voice communications budget represents costs for communicating between company locations.

A Poorly Performing Network

The Star configured network shown in Figure 1 comprising the 10 WANs



facilitates the centralized reporting of all shipments and billing information for this chemical products manufacturer. Each night consolidated report files are transmitted back to each of the 10 divisional node locations for local printing and distribution. Communication between remote nodes equipped with HP-UX platforms is through an HP X.25-9000 link on the central host HP-UX computer, which is fronted by an HP 45 X.25 TOWER switch. Access to the hub AS/400 and a few remote AS/400s is through separate point-to-point 9.6-KBPS links. In addition to the centralized reporting process, the private X.25 network affords an awkward form of internodal communication by providing a form of routing between locations through the corporate hub.

The UNIX side of the network developed by HP network consultants has a built-in design flaw. In their design, all inter-computer traffic throughout the network is forced through the hub site and the HP 45 X.25 switch. Since there are many users running jobs on divisional computers other than their own, response time has suffered. This is due to the fact that all job requests must first go through the hub site in order to be routed to the computer of their choice.

When all 10 remote "smart" nodes transmit at the same time (at 9.6 KBPS), their combined traffic can overcome the single X.25-9000 port at the Valley Forge hub (limited to 48 KBPS)! Therefore, after the fifth remote node sends a file to the hub site, all remaining users are temporarily locked out and put on hold!

FIGURE 1: INITIAL STAR CONFIGURED NETWORK

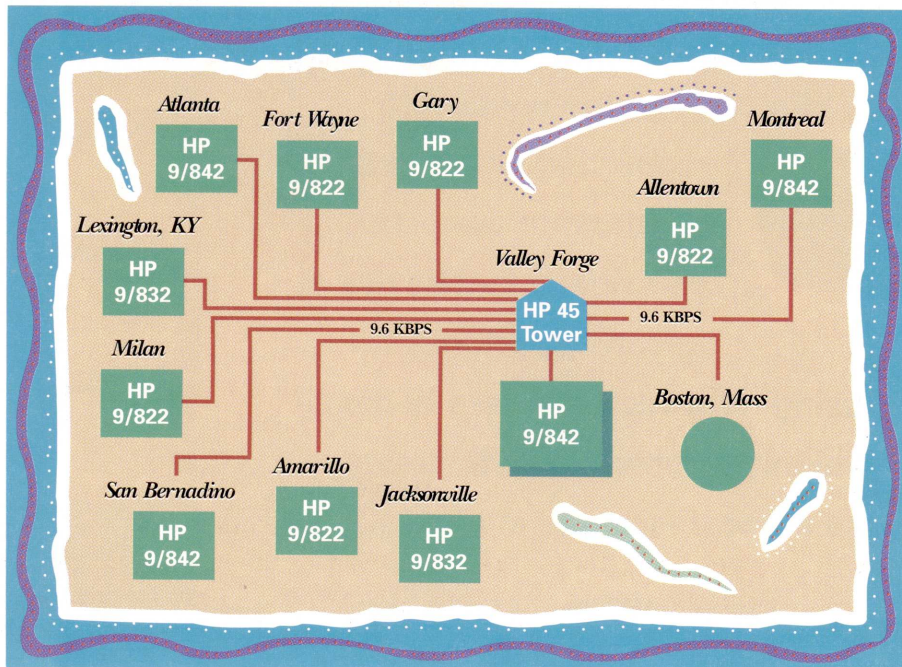
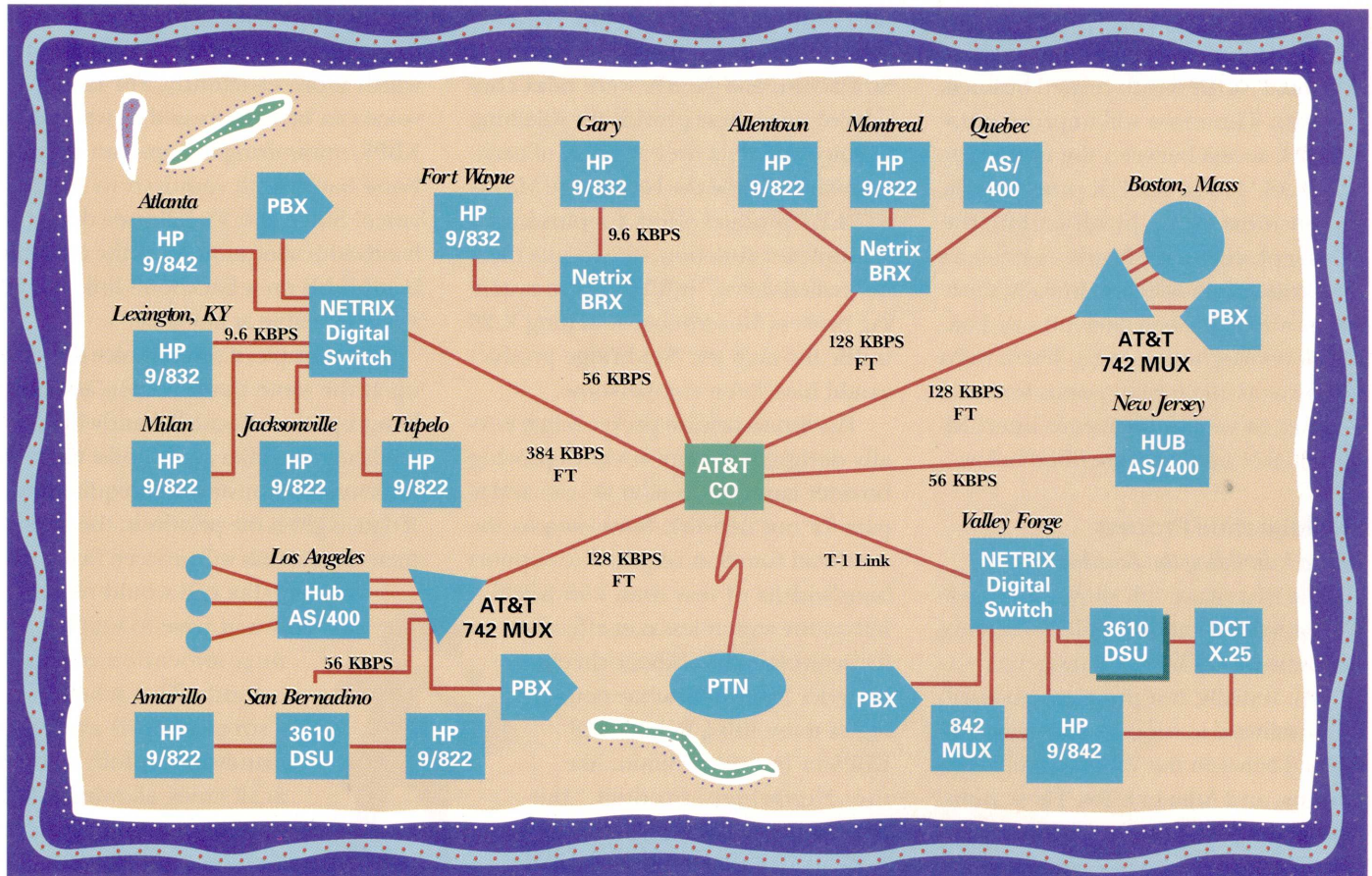


FIGURE 2: FAST PACKET DIGITAL SWITCH WITH F/T BACKBONE



Since the single port supporting all inbound traffic can operate only at 48 KBPS, the network is forced into performance delays during the "busy" hour. It is obvious such a design requires additional resources to support intranet-network computer access.

Leveraging the Data Communications Budget

Figure 2 shows a migration plan for the network (includes new acquisitions) deploying a 64-KBPS network strategy. This plan will allow the network manager to leverage the fixed cost of the data network to offset costs for voice, fax, and electronic mail. Deploying digital carrier

services coupled with advanced digital compression using fast packet switching, this design uses more cost-effective 64-KBPS channel modules that can be blended into high-capacity, low-cost backbone links. Therefore, since 15 percent of the total telcom budget represented voice and fax communications between plant locations, a savings of over \$300K will be attained by integrating the intra-corporate voice/fax traffic over the data network.

Figure 2 represents the first phase of a five-year migration plan that will enable users to improve performance by extending the ability of the network to absorb a growing demand for bandwidth.

Different network facility arrangements were examined in conjunction with this network plan, resulting in the identification of additional cost savings. For example, local loop costs supporting interstate traffic via IXC circuits in some jurisdictions, i.e., Nynex, Americom, and Pactel, could be provisioned under "hub-less" or contaminated circuit tariffs (FCC#2), cutting local loop costs in half!

Beginning the Three-Phase Network Solution

To support the network performance objectives for the short term, four network switching/concentrator hubs will be created as shown in Figure 2,

consolidating the present dedicated circuits shown in Figure 1. This move creates three subnets consisting of those divisional NODES with related business interests. This move will improve intra-network access between the other divisional AS/400 or HP-UX processors in the business group by offloading the routing process to the Netrix #1-ISS communication hub switches. Initially, there will be two major switching hubs and two minor concentrating hubs. These hubs will serve as integration points for voice and fax, as well as for future interdivisional LAN traffic as described below.

The Migration Process

Phase I: Building the Backbone

The first phase will allow the consolidation of dedicated circuits, providing the network backbone arrangement as shown. Initially, two principal hubs will be established to support the major traffic load between the Valley Forge, Pennsylvania, and Atlanta hubs. These hubs, equipped with Netrix #1-ISS digital switches, will serve to remove all routing/switching requirements from the HP-UX computers on the network. The #1-ISS through the two remote Netrix BRX switches will allow the AS/400s and the HP-UX computers to transit through the #1-ISS to their respective platforms at the hub site. The HP 45 TOWER X.25 switch located at the Corporate hub will now be replaced by the more efficient #1-ISS. This will improve overall network throughput as well as the efficiency of internal application processing at each node.

Why a fast packet switch?

While T-1 multiplexers equipped with voice compression cards were considered first, it soon became apparent that multiplexers do not support switching, nor

do they offer a convenient way to support multiple types of network traffic. Fast packet switches by Newbridge, Stratacom, and Netrix were next considered since these provide for switching of voice and data over a variety of carrier services. While the Newbridge MAIN-STREET product offers a sophisticated multiplexer function, all circuits must be "nailed down," inhibiting the switching process. In addition, switching X.25 traffic through the Newbridge product would have been cumbersome.

The Stratacom fast packet switch is really designed for networks deploying broader bandwidths than we can anticipate for our network. For example, the overhead function required to support bandwidths of less than 256 KBPS makes the switch less cost-effective for networks with backbone circuits of under 256 KBPS, to say nothing of those using links of 128 KBPS or less. In addition, like the Newbridge product, the Stratacom switch does not handle X.25 network switching.

The Netrix #1-ISS was selected for this network design (Figure 2) for its ability to fit in as an outbound X.25 switch, removing the switching function from the HP 9000 Series 800 computers. Further, the Netrix #1-ISS will support much higher X.25 traffic loads than either the HP-UX or the HP 45 Tower X.25 switch. In addition, the #1-ISS will integrate and manage both voice and data traffic more effectively between the locations shown.

Since the #1-ISS switch will support different types of traffic, i.e., HP X.25, AS/400 Token Ring, Switch Circuit traffic, etc., each with different bandwidth requirements, common backbone links can be established to support access and

data transport between all systems. Further, the #1-ISS provides several different techniques for managing bandwidth more efficiently. For example, voice can be compressed down to 5.33 KBPS, minimizing the amount of backbone bandwidth required to support voice. Since the #1-ISS uses dynamic bandwidth allocation, all of the available bandwidth on a backbone link can be made available at any time.

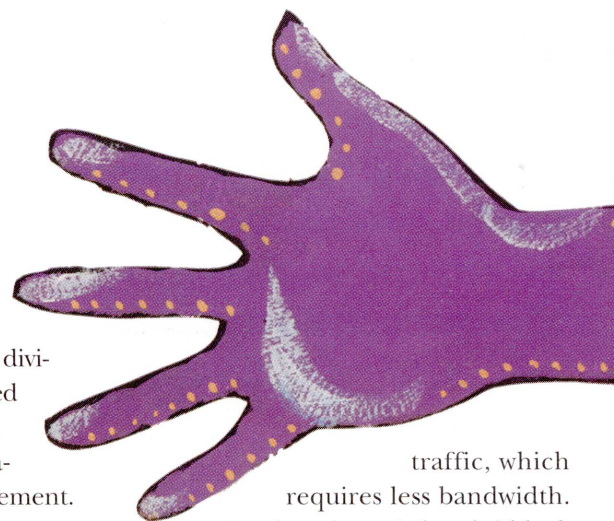
For example, if several voice links are up at the same time, as soon as callers hang up, the allocated bandwidth immediately becomes available for the next information transmission requirement. If data is given the priority in the system, then all data calls will proceed first, while

a voice/fax call would receive a busy and have to wait for the next allocation of bandwidth. This scheme ensures that all available bandwidth is fully utilized at all times, allowing much smaller channel aggregations, i.e., 128 KBPS or 256 KBPS for backbone links

where larger bandwidths might otherwise be required.

The unique capability of the #1-ISS switches to "pack" a backbone link allowed the planner of the network shown in Figure 2, to consolidate over 62 percent of the network's data traffic over a packed F/T link (386 KBPS) between the corporate hub and four divisional nodes. This will facilitate the integration and transport of voice traffic between locations. The #1-ISS's ability to interface T-1 circuits will enable the planner to support the existing T-1 local loop access at the Valley Forge hub as well as at the Atlanta site to consolidate local loop access requirements.





In addition, the #1-ISS at the corporate hub will allow the users to eliminate an underutilized dedicated T-1 link used for long distance voice traffic since that traffic can now be accommodated through the #1-ISS and a single attached T-1 link. The #1-ISS switch at the Valley Forge hub will be used to support the point-to-point 386-KBPS link from the Atlanta hub as well as the three consolidated circuits coming from the Indiana, California, and Pennsylvania/Canada locations.

These locations will be provisioned with 56-KBPS links and Netrix BRX concentrators. Three individual 8-KBPS voice channels will be defined on the 256-KBPS F/T link, providing three E&M TIE lines between the Atlanta System 75 and the System 75 located at the Valley Forge corporate hub. This will provide support for inbound voice/fax traffic originating at the Atlanta hub. In turn, the #1-ISS will switch data traffic company-wide, keeping X.25 switching entirely outside of the HP-UX computers and thereby facilitating the migration to an all 64-KBPS network integrating voice and data across the entire corporate network!

Phase II: Enhancing the Divisional Computer Linkage

During Phase II, voice/data compression Netrix VFM modules will be implemented on upgrade 56-KBPS links between the #1-ISS at the newly established hub locations and the divisional computer centers. This will provide between each of the divisional computer centers and the switching hub two voice/fax and four 9.6-KBPS data channels all compressed over a 56/64-KBPS channel. The #1-ISS at the Atlanta and Valley Forge hubs will then route the voice/data traffic to each of the locations

linked via the Netrix VFM modules. This strategy will allow all divisional users to leverage their fixed data costs to transmit voice/fax traffic between company locations at a very modest cost increment.

Phase III: Extending the 64-KBPS Strategy

During PHASE III the enhanced 64-KBPS strategy will be extended to selected remote divisional users accessing the divisional nodes. Existing 9.6-KBPS links will be upgraded to multiplexed 64-KBPS service using either Netrix BRX or VFM compression multiplexers. This will increase the number of data channels available at the remote user sites and provide additional voice/fax E&M links. These devices will also facilitate the interface of either Token Ring or Ethernet LANS via Token Ring or Ethernet interfaces.

This enhancement will contain the cost for intracorporate communications by providing an internal avenue for the transport of information. Further, since the #1-ISS switches voice and data in the same manner as a central office switch, the company will save additional money in long distance voice/fax costs as traffic can be directly routed through company locations spread across the United States and Canada.

Taking Aim at the Future: A 64-KBPS Strategy

Dedicated point-to-point network strategies are no longer cost-justifiable. Dedicated backbone strategies for mid-size private networks make more sense when supported by advanced data compression technology. This is due to the fact that dedicated digital circuits can be packed with compressed voice/data

traffic, which requires less bandwidth.

Further, dynamic bandwidth allocation techniques associated with data compression devices ensures all available bandwidth is used efficiently. Fast packet switches like the Netrix #1-ISS support an array of connectivity options which include X.25, private/public Frame Relay, and switched circuits. This combination of technology provides an option for future interconnection of dedicated LAN at divisional locations and supports the integrated transport of voice/data traffic over the same circuits.

One of the advantages of using advanced technology found in fast packet switches like the Netrix #1-ISS is the ability to support a future private Frame Relay network. In the network illustrated in Figure 2, as the users' traffic levels increase, their fast packet switch can be easily upgraded through simple upgrade kits for both the HP-UX and Netrix systems, allowing the migration to a private frame relay network with an interface into any public frame relay network. In this network solution, the planner was able to position his network to support any combination of network connectivity well into the next century. ■

Presently a consultant with Vermont Studies Group, Inc., Andres Llana, Jr. is a nationally known writer on telecommunications topics. His technical and management career spans more than 30 years and includes positions such as manager, Advanced Plans and Computer Services for GE and RCA, where he was responsible for implementing a nationwide time-sharing center.

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ad • vo • cate: to plead in
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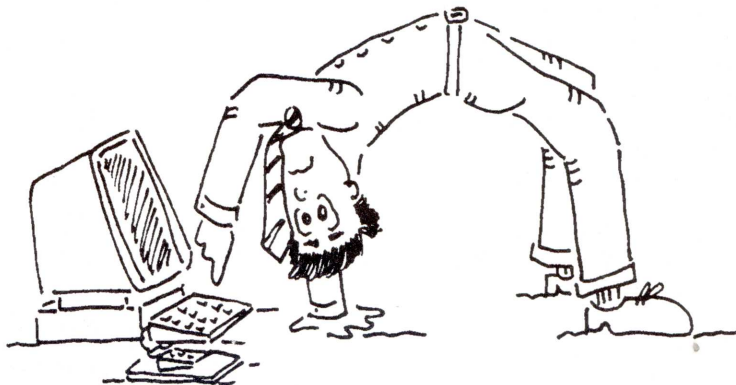
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Remote Watch

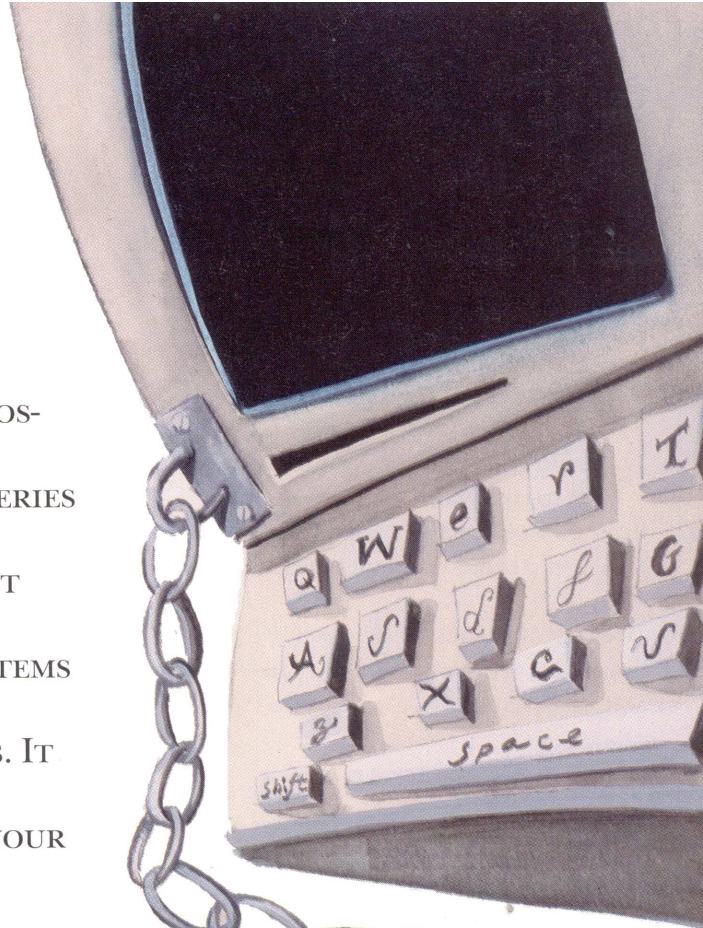


ILLUSTRATION BY
BEVERLY HONG

HP REMOTE WATCH IS A PROACTIVE DIAGNOSTIC TOOL THAT "WATCHES" THE HP 9000 SERIES 300, 400, 700, AND 800 HP-UX SYSTEMS. IT HELPS INCREASE THE UPTIME OF THESE SYSTEMS BY MONITORING THE DAY-TO-DAY CHANGES. IT AUTOMATICALLY COLLECTS THIS DATA ON YOUR SYSTEM AND ON ANY DISKLESS CLIENTS.

THE SOFTWARE THEN COMPARES THIS DATA AGAINST PREVIOUS DATA, PREDETERMINED THRESHOLDS, AND/OR ERROR MESSAGE FILTERS. VIA E-MAIL, IT REPORTS CONFIGURATION CHANGES, EXCEEDED THRESHOLDS, AND SIGNIFICANT ERRORS. THE SYSTEM ADMINISTRATOR CAN UTILIZE THIS INFORMATION TO SOLVE POTENTIAL PROBLEMS, AS WELL AS TO INCREASE SYSTEM PRODUCTIVITY.

*by Rebecca
Coggins Propst*



HP Remote Watch was developed for a dual purpose:

1. to help HP support personnel provide better remote support to customers
2. to give customers valuable information about their systems that could prevent system downtime

HP Remote Watch can assist HP Support Engineers in solving customers' problems more quickly. It was designed to enable an engineer to log into the customer's system over a modem and determine:

- When a system's configuration was changed
- What a system's configuration was on a given date
- The system's current configuration
- The system's bootup messages
- LAN and/or disk space usage statistics

HP Remote Watch is divided into the following modules that monitor your system's functions. Each of these modules collects and analyzes a particular type of configuration data:

- Diskless Cluster Information (diskless module)
- Disk Configuration (disks module)
- Kernel Error Message Buffer Information (dmesg module)
- Log File Monitoring (fimon module)
- Core File Check (fimon module)
- Kernel Configuration (kernel module)
- LAN Statistics (LAN module)
- Line Printer Spooler Status (lpstat module)
- System Security (security module)
- Device File Status (slashdev module)
- SPU and Backplane Configuration (SPU module)

Using its own scheduler, HP Remote Watch schedules most of these modules to run nightly at 2 a.m. The exceptions are "File System Security" and "Core File Check," which are run weekly. The output from these modules is mailed to root. Both the run times and the output destinations can be changed by the system administrator. Above is an example of output from HP Remote Watch mailed to root.

A Little History

HP Remote Watch is often mistakenly referred to as Support Watch, which is another HP support product. To understand how this confusion arose it is important to know the history of HP Remote Watch (see Figure 1). At HP-UX 7.0, HP Remote

```
***** Messages from kernel module:
INFORMATIONAL: Configuration change detected
                  by kernel module. (RW9000)
Difference in data:
Data from 93-02-18:

> LAST REBOOT:      Mon Feb 8 10:56:32 1993
Data from 93-02-19:

< LAST REBOOT:      Fri Feb 19 14:16:32 1993

***** Messages from lan module:
WARNING: Ratio of 3848 "Unknown protocol"
         to 32389 "frames received" (11.88%)
         exceeds limit of 10.00% (RW540)
```

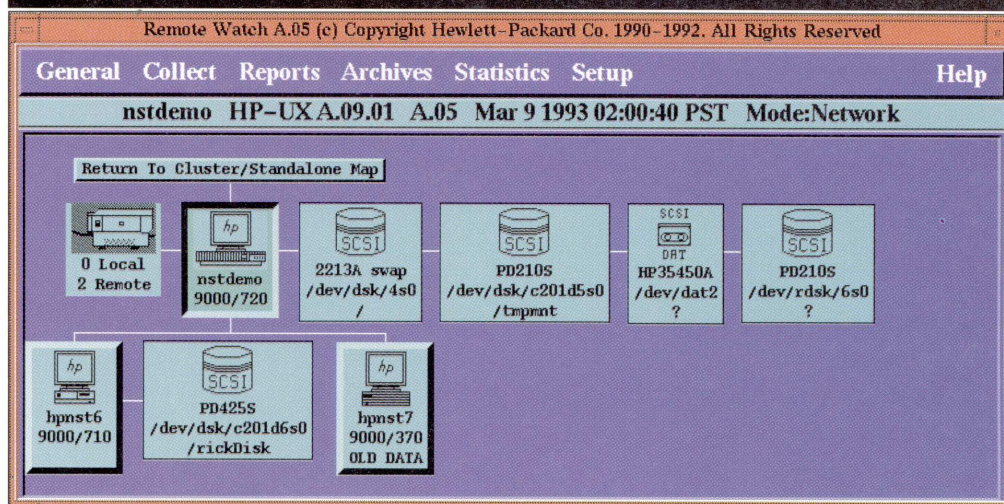
Watch was introduced for the Series 300 and 400 only.

When HP Remote Watch was ported to the Series 800 on HP-UX 8.0, it was bundled with another support software product called Predictive Support. Predictive is a proactive warning system that monitors hardware devices such as disk drives and memory. When Predictive determines there is a possible

FIGURE 1 HP Remote Watch Release History

RELEASE	PLATFORM	DESCRIPTION
A.00	Series 300/400 running HP-UX 7.0, 7.03, or 7.05	First Release
A.01	Series 300/400 running HP-UX 8.0	Port to HP-UX 8.0
A.02	Series 300/400 running HP-UX 8.0, Series 700 running HP-UX 8.07	Port to Series 700, support for mixed clusters, complete directory restructuring, inclusion of the HP Remote Watch Graphical Interface (XRW) for customer use, and addition of security checking module
A.03	Series 300/400 running HP-UX 8.0, Series 800 running HP-UX 8.0, 8.02, or 8.06	Port to series 800. Name changed to Support Watch
A.04	Series 300/400 running HP-UX 8.0, Series 700 running 8.07	Addition of system log file monitor and core file checker
A.05	Series 300/400/700/800 running HP-UX 9.0 and 9.01	Port to HP-UX 9.0, addition of graphical display statistics and system access attempt checker. Name changed back to HP Remote Watch
B.00	Sun SPARCstation SunOS 4.1x	Port to SunSPARC stations

FIGURE 2



hardware failure, it alerts the Response Center via modem to an 800 number. Predictive runs only on the Series 800. However, for only this revision of HP Remote Watch, the name was changed to Support Watch for all HP-UX systems, including 300, 400, and 700.

As of HP-UX 9.0, it was renamed HP Remote Watch for the Series 300, 400 and 700. Support Watch is now the name of the

Predictive/Remote Watch software bundle for the Series 800. The Predictive part of Support Watch is the only software package that calls the Response Center. HP Remote Watch never dials the Response Center about possible problems.

XRW

The HP Remote Watch Graphical Interface (XRW) is a separate X Windows/Motif-based program that provides a

graphical interface to HP Remote Watch. The key feature of the XRW program is that it provides a graphical visualization of the configuration of the cluster or stand-alone systems (Figure 2). It provides an icon-based configuration map that gives a graphical representation of a computer system SPU (including those of both server and clients), disk drives, CD-ROM drives, and printers. XRW runs only in an X window environment.

FIGURE 3

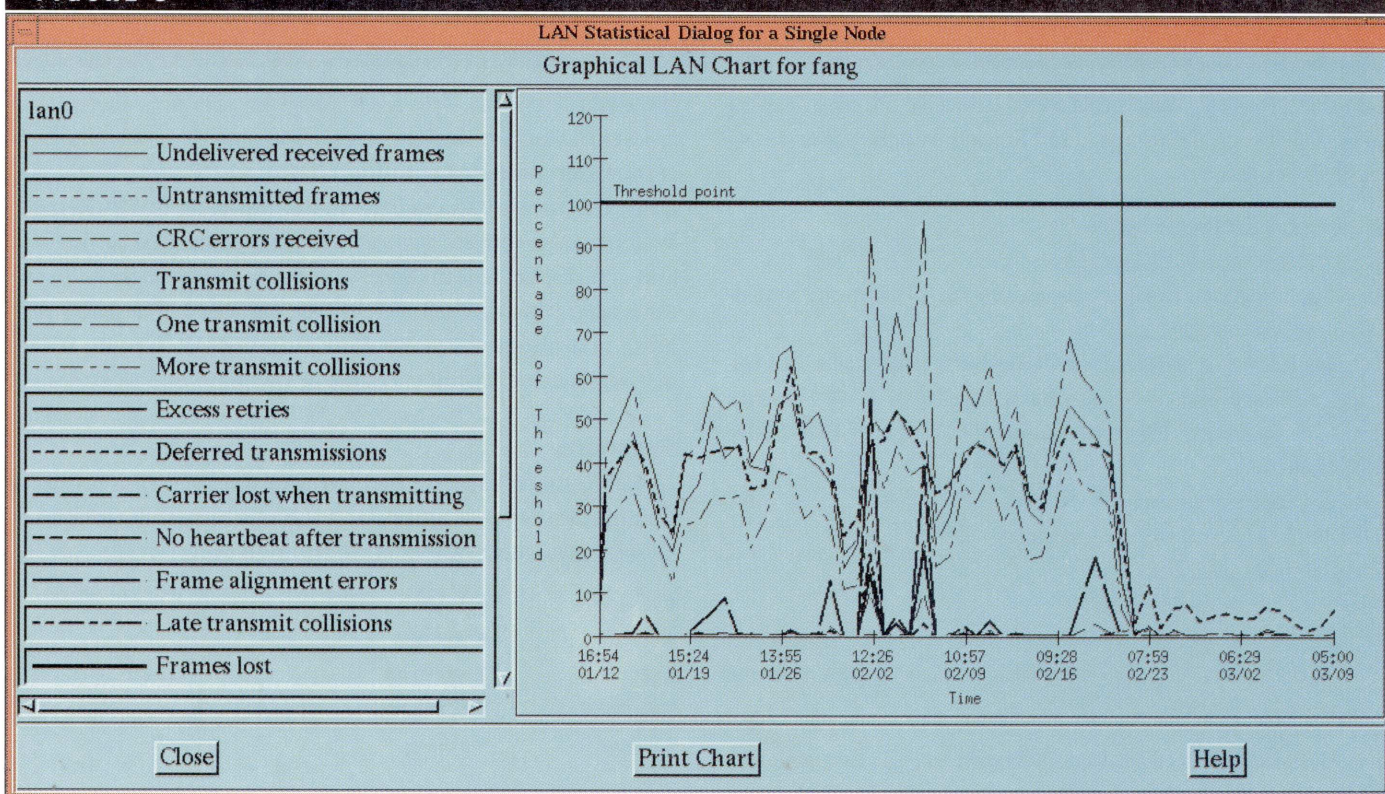
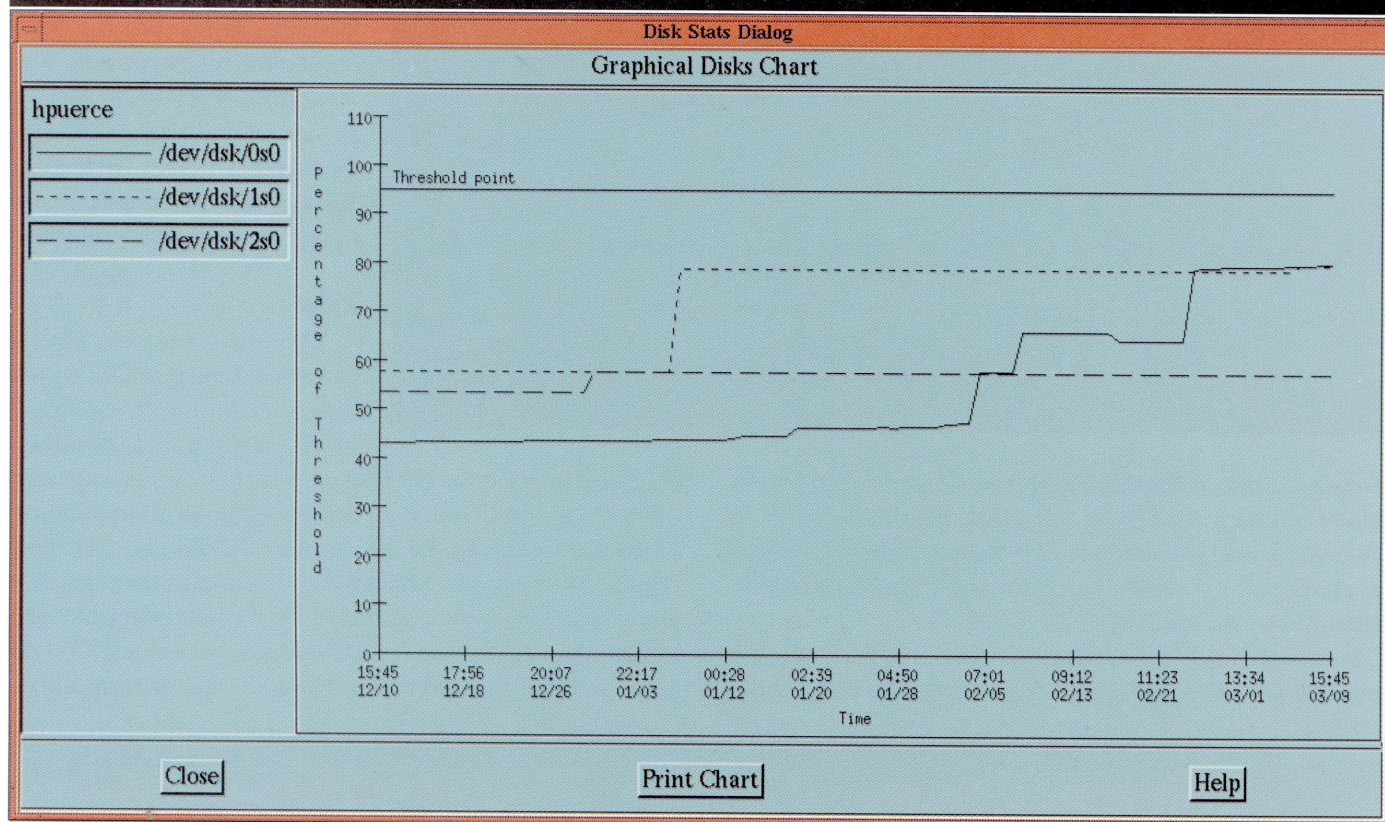


FIGURE 4



The HP Remote Watch Graphical Interface also provides an interface between the user and HP Remote Watch data and programs. It is used to:

- View configuration reports
- View archived e-mail messages
- Collect current configuration data on clusters or stand-alone workstations
- Display LAN and disk usage statistics both graphically and numerically (see Figure 3: Graphical Display of LAN Statistics previous page; and Figure 4: Graphical Display of Disk Statistics, above).
- Display security reports
- Display log file monitoring reports
- Display boot messages
- Obtain online message help
- Provide an interface to customize HP Remote Watch operations
- Provide Predictive support configuration display menus, for Series 800 only

By default, HP Remote Watch Graphical Interface accesses HP Remote Watch data and programs on the local cluster/

stand-alone system. The XRW program also provides a higher-level cluster/stand-alone icon-based map that contains icons representing systems running HP Remote Watch. The icons allow the user to access information quickly in HP Remote Watch on the remote systems. The map is created by the user and can display systems accessible via the network but not systems accessible via the modem (see Figure 5). The XRW program may also access a machine running HP Remote Watch across a modem connection using DataComm Screen.

Functions

HP Remote Watch is divided into the following modules that monitor system functions, each of which collects and analyzes a particular type of configuration data:

- | | |
|------------|------------|
| ■ diskless | ■ LAN |
| ■ disks | ■ lpstat |
| ■ dmesg | ■ security |
| ■ kernel | ■ slashdev |
| ■ fmon | ■ spu |

Module Functions

Diskless Cluster Information (*diskless module*)

When running on the server of a diskless cluster, HP Remote Watch tracks which client nodes (cnodes) are configured on that server, and reports changes to this list. HP Remote Watch also reports a message if a cnode is configured but is not running.

Disk Configuration (*disks module*)

HP Remote Watch's disks module examines the CS80 and SCSI devices connected to the system, including mounted devices, swap devices, and all devices with device files existing in the /dev directory or listed in the /etc/checklist or /etc/mnttab files. It also checks the capacity of the mounted file systems.

Kernel Error Message Buffer Information (*dmesg module*)

HP Remote Watch executes the dmesg(1M) command every 15 minutes and reports any resulting error messages as part of the error messages generated by HP Remote Watch. If your system already has a dmesg entry in its crontab, HP Remote Watch will not collect dmesg data.

The resulting error messages are those printed by the system when unusual events occur. These messages are generated for a variety of reasons, such as difficulty writing to a tape

drive or system table overflow. Critical error messages are mailed immediately.

Log File Monitoring (*fmon module*)

HP Remote Watch monitors a user-extensible list of log files for those exceeding user-specified thresholds. The Log File Monitor runs at the frequency and time of day specified by the user, and informs the user by e-mail when the thresholds are exceeded.

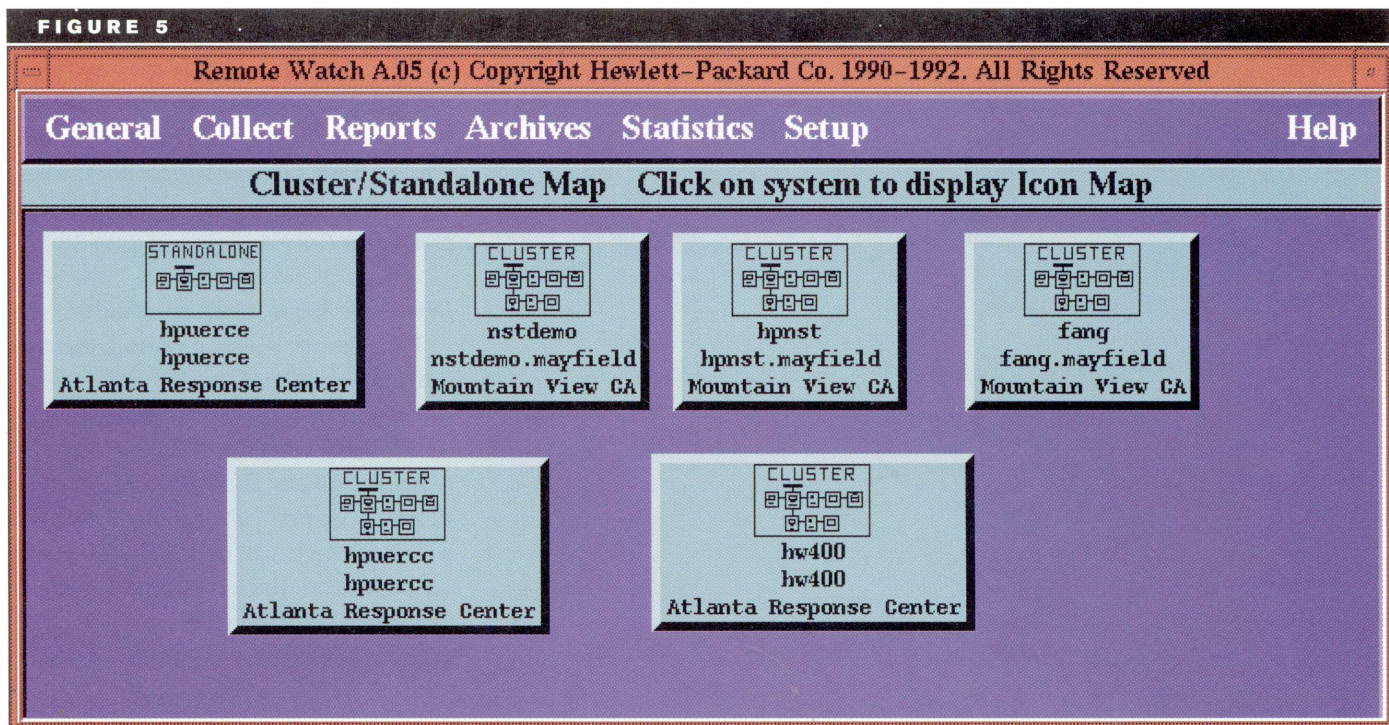
Core File Check (*fmon module*)

This second function of the fmon module examines all directories on all hfs mounted file systems for the presence of core files. The Core File Check program runs at the frequency and time of day specified by the user. The size and absolute path of the core files are given in an e-mail report to the user. HP Remote Watch does not remove core files.

Kernel Configuration (*kernel module*)

HP Remote Watch reports which drivers are configured into the kernel (including custom drivers), and reports the values of kernel parameters. It also reports the date and time at which the kernel was last generated.

FIGURE 5



Qualifying System Support Services and Options

PRODUCT # HP SYSTEM SUPPORT SERVICES

H5354A	Hardware Support with Software Information and Updates
H5355A	Hardware, Software, and Network Support
H5356A	Personalized System Support
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#0s1	Same-day hardware support and software license
#0s2	Next-day hardware support and telephone license
#0s3	Same-day hardware support and telephone license

HP REMOTE WATCH VERSION INFORMATION

Version	Machine	Operating System	Media Options
H2534A	\$300/400	HP-UX 7.0	Cartridge
H2534B	\$300/400	HP-UX 8.0	Cartridge, DDS, or CD-ROM
		HP-UX 9.0	
H2534C	\$700	HP-UX 8.07	DDS or CD-ROM
		HP-UX 9.01	DDS or CD-ROM
H2534D		SunOS 4.1x	Cartridge, CD-ROM

HP REMOTE WATCH ORDER INFORMATION

Part/Product No.	Description	Qty	Supplier	Media	Op/Sys
H2534-60001	Kit-HP HP Remote Watch-7.0 Release (Series 300/400)	1	5006	CART	7.0
H2534B	Kit-HP HP Support Watch-A.04 Release (Series 300/400)	1	5006	CART	8.0
H2534B	Kit-HP HP Remote Watch-A.05 Release (Series 300/400)	1	5006	CART	9.0
H2534B	Kit-HP HP Remote Watch-A.05 Release (Series 300/400)	1	5006	DDS	9.0
H2534B	Kit-HP HP Support Watch-A.04 Release (Series 300/400)	1	5006	CD-ROM	8.0
H2534B	Kit-HP HP Remote Watch-A.05 Release (Series 300/400)	1	5006	CD-ROM	9.0
H2534C	Kit-HP Support Watch-A.04 Release (Series 700)	1	5006	DDS	8.07
H2534C	Kit-HP Remote Watch-A.05 Release (Series 700)	1	5006	DDS	9.0
H2534C	Kit-HP Support Watch-A.04 Release (Series 700)	1	5006	CD-ROM	8.07
H2534C	Kit-HP Remote Watch-A.05 Release (Series 700)	1	5006	DDS	9.0
H2534D	Kit-HP Remote Watch on Sun-B.00 Release (Sun SPARCstation)	1	5006	CART	4.1
H2534D	Kit-HP Remote Watch on Sun-B.00 Release (Sun SPARCstation)	1	5006	CD-ROM	4.1

LAN Statistics (LAN module)

HP Remote Watch's LAN module displays LAN card statistics in the same format as the landiag(1M) command. Limits for LAN statistics values are specified; HP Remote Watch then compares the actual statistics accumulated on the card against those limits, reporting when the limits are exceeded.

Line Printer Spooler Status (lpstat module)

This module is based on the lpstat(1) command. It shows line printer configuration changes, scheduler status, and the accept/enable status of each destination.

File System Security (security module)

The file system security program looks for potential security problems in your file system that could be exploited by someone seeking to gain illegal access to your system. Also as of HP-UX 9.0 this module looks for unauthorized system access attempts. This module runs on stand-alone systems and servers, but not on client nodes. This module does not guarantee full compliance with government standards such as those outlined in the United States Government document, *Department of Defense Trusted Computer System Evaluation Criteria*.

Device File Status (slashdev module)

HP Remote Watch monitors the current status of the /dev directory and its subdirectories for the system's device files. All files that are "normal" files (not directories, pipes, device files, etc.) are shown as errors. HP Remote Watch determines whether all device files belong to the cnodes on which they are running. If running in verbose mode, it also checks to see whether the combinations of device files, cards, logical drivers, and interface drivers present on the system are correct.

SPU and Backplane Configuration (spu module)

HP Remote Watch tracks SPU and backplane configuration information, including such information as family, model, processor type, coprocessors, and cards present.

HP Remote Watch is provided free to qualified customers as a feature of all HP System Support services and all HP System Support Options. The customer must have some level of on-site hardware support and on-site software support. This product is also a feature of existing support services (HP BasicLine Software Support, HP ResponseLine Software Support, or HP TeamLine Software Support) for customers who have not rolled to the new services. Customers with existing services must have both on-site hardware and software support contracts. Customers wishing to install HP Remote Watch on their systems should contact their local offices. HP Remote Watch

is customer installable on 300, 400, and 700 systems. However, HP Support Watch must be installed by an HP service representative on 800 systems.

The accompanying sidebar gives information on system support services, Remote Watch versions, and ordering. For more information see the *HP Remote Watch User's Guide HP 9000 Series 300/400/700 Computers*, HP Part Number H2534-90017 and the *HP Support Watch User's Guide HP 9000 Series 800 and Series 800 Clusters*, HP Part Number H5169-90005. ■

Rebecca Coggins Propst is an HP Response Center Engineer working on the System Datacom Team. She has been working for HP for the last four years. Previously she worked for Lockheed Georgia as a software developer for manufacturing process.

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CIRCLE 11 ON READER CARD

Software Review

by James P. Roynan

Bluestone's Onyx

THE RUSH BY DEVELOPERS to Graphical User Interfaces (GUI) during the last several years has left many an IS manager and product developer with a stable of character applications that lack the standardized, easy-to-use environments that end users find appealing and managers find productive. As more and more products and in-house systems take advantage of the GUI environments, old character applications become further antiquated. The longer these applications are in use, the more costly it becomes to rewrite them for today's applications environments. Faced with the alternative of costly, lengthy GUI development to replace these older applications, many companies are content to plod along with their character applications. After all, "If it ain't broke, don't fix it!"

However, the recent and rapid ascendancy of new technology, specifically GUIs, has given way to a new credo for applications developers and IS organizations: "If it ain't broke, break it!" But breaking old applications in order to develop and implement newer technology is still a costly proposition. With GUI development typically constituting well over 60 percent of a development project, the cost of rewriting old, character applications escalates in proportion to the functionality and sophistication of the GUI to be implemented.

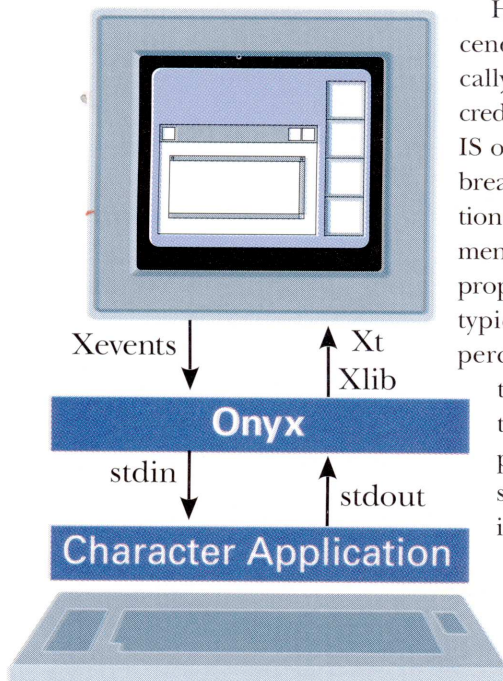
Bluestone Consulting Inc., of Mt. Laurel, New Jersey, has recently introduced a tool that not only provides GUI functionality to character applications, but does so for a fraction of the cost of traditional development techniques. Onyx, version 1.0, brings the benefits of a Motif GUI to character

applications by providing an almost seamless integration of a new graphical user interface with existing application source code through easy-to-use techniques and mnemonic function calls.

Extra Functionality

The X Window system provides a sophisticated, complex environment for application development and use. The Motif and Open Look interface standards, the two most used interfaces for the X Window environment, provide additional functionality and impose standard interface design and program behavior on X Window applications. The benefits that accrue to organizations using standard GUIs for their applications range from decreased end user training to higher productivity. But the cost of migrating old applications to this environment is often daunting.

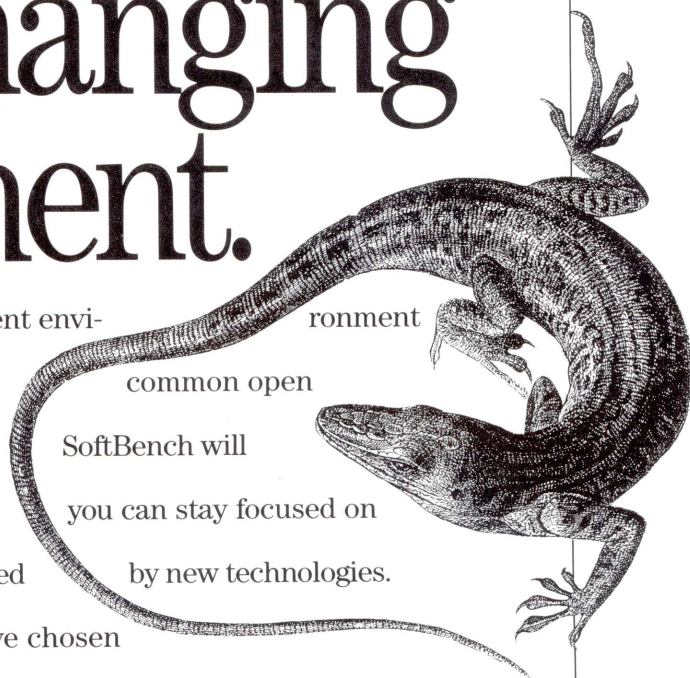
UNIX and non-UNIX workstations come packaged with X server software. While character-based applications can run in an xterm window under X, they cannot take advantage of traditional GUI functionality such as dialogue boxes, pull-down and pop-up menus, and buttons. In order to execute these functions, the entire application must be redesigned and rewritten using either Xlib function calls or GUI toolkits for Motif or Open Look. The redesign must incorporate event-driven logic—the ability to respond to an array of possible end user input received at virtually any time. Character applications traditionally provide a rigid, structured sequence of steps for the end user to follow. This design concept is at odds with GUI because there is only a small range of valid responses at any point in the character application. By contrast, GUIs allow the end user to perform any task at any time



**Figure 1: The Onyx
Execution Environment**

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SoftBench, making it the leading UNIX development solution. It's no wonder. SoftBench has a powerful integrated toolset that accelerates how you generate code and OSF/Motif user interfaces. It also provides process management tools that help you deliver high-quality software on schedule. Plus, HP and SoftBench licensees give you a choice of more than 70 development tools on 11 platforms including HP, IBM and Sun.

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during the execution of an application.

Onyx integrates GUI features using the existing application's code and design, and provides the event-driven structure necessary for GUI applications. Onyx takes advantage of X Window's ability to run character applications in an *xterm* window by supporting the ANSI and VT100 terminal emulations. Onyx generates extended ANSI sequences from within the application that are interpreted by its run-time module. These extended escape sequences are designed specifically to complement the standard ANSI protocol. The run-time module provides support for the Motif GUI pull-down menus and push buttons that replace the function keys of older applications. In some instances, developers need not change their existing application source code at all to provide the desired GUI functionality. By modifying the source code, however, developers can take full advantage of the Motif environment by providing text input boxes, file selection boxes, lists, and dialogue boxes through Onyx.

Two Methods

Onyx provides developers with the flexibility either to use the appropriate ANSI escape (ESC) sequences directly or to invoke Onyx' Convenience Library. Utilizing the ESC sequences requires the developer to add the ESC sequence commands to the existing application source code. Onyx commands are constructed and generated by the application, and are then read and interpreted by Onyx. ESC sequences generally produce one of three results: alter the window in view by the end-user; modify Onyx' internal state; or send information back to the application. To a character application, Onyx appears as an enhanced VT100 series terminal.

The character application can perform all of the operations that would normally be performed by a true VT100 terminal, and Onyx provides the ability to manipulate GUI objects as an extension to the basic terminal protocol. The extensions also serve to notify the application of user input activity. (See Figure 1.)

The Convenience Library is a feature unique to Onyx. Unlike other GUI translators, Onyx provides an easy and straightforward alternative to the esc sequence protocol. The Convenience Library allows the developer to generate the required character strings by invoking them through mnemonic function calls. Rather than embed explicit ESC sequences in the application, Onyx function calls provide meaningful, self-documenting names to the process. The character application calls the desired function by name and provides a list of string and/or integer parameters, and the Convenience Library generates the proper ESC sequence commands.

For example, an application may wish to set its virtual screen size. Using the standard Onyx protocol, the command would appear as follows:

```
ESC %<width>;<height>A
```

The width and height parameters would be set, in columns and rows, by the application. Alternatively, the developer may set the virtual screen size of the application by utilizing the equivalent Convenience Library function. The command would then appear as:

```
OxSetVirtualScreenSize(width, height)
```

The Onyx Convenience Library provides a useful alternative to the ESC sequence protocol used in most GUI

translators. By using this feature, application code becomes self-documenting, thus making it easier to develop, maintain, enhance, and test. Every command supported by Onyx has an equivalent mnemonic function call.

Custom Setup

Onyx provides the developer with the ability to tailor an application's run-time behavior by specifying values for the resources it recognizes. Upon start-up, an application can specify values that include:

- row and column measurements
- desired fonts
- menu bars and their contents
- scroll bars
- push buttons and button labels
- color schemes

Onyx supports all of the fonts available in a given environment and full ANSI 16-color functionality. Users can map resources to any color supported by the installed X server.

Onyx uses the X resource manager to process the configurable resources. The resources are set in the same way as with any toolkit application. Onyx allows the developer to set resources differently for different applications. By invoking Onyx using the *-name* option, the developer can specify resources which will be set only for applications executed with the new name. For example, an application to capture data on an order form might be called "order_form". When that is invoked with Onyx using the name "order_form", only the resources for that application will be set. Using this feature, developers can provide unique resource settings for each application that uses Onyx.

Full Motif Support

Onyx provides all of the support required to implement a fully compliant Motif interface to existing character applications. By translating end user keyboard activity to mouse and text input, the application maintains its structure and functionality while Onyx provides the event-driven structure inherent in GUI applications. Developers can implement the entire set of Motif objects through Onyx. The supported objects fall into one of the categories listed in Table 1.

Providing a GUI interface for the vi editor proved to be an easy task. The interface was generated in a matter of a few hours using the concise, comprehensive documentation provided. The interface was based largely on the example provided with the Onyx developer's kit, and contained drop-down and cascading menus, push buttons, scroll

TABLE 1 *Motif Objects Supported by Onyx*

General Control	Vertical Scroll Bar Control
Set Screen Size	Menu Control
Communicate with Motif	Dialogue Box Control
Button Box Control	Message Box Control
Function Button Control	Color Control
Horizontal Scroll Bar Control	

bars, menu bars, file selection lists, and pop-up dialogue boxes to enhance such functions as find and replace. Onyx comes with several example programs that help developers understand the functionality and structure of Onyx and its relationship with the character applications it will support. The example programs are installed during the Onyx installation, and provide developers with a basic understanding of Onyx.

Future Enhancements

Release 1.1 has been scheduled for late 1993 and will incorporate an encapsulation option that allows developers to generate simple, English-like scripts to support the inclusion of GUI objects. This feature will allow developers to support GUI objects fully without the need to alter character application sources code. Using the encapsulation option, the output of the application is passed through the "interpreter." The output of the application is parsed to determine the desired functionality (e.g., "When line 10 starts 'warning', popup error_dialogue with text from line 10, columns 10 to 65"). The encapsulator assembles and outputs the appropriate ESC sequence. Onyx then performs the desired function based on the command generated by the encapsulator.

Release 1.1 will also provide support for widgets within the character window. Developers can move their applications closer to true GUI applications by providing support for text widgets that will accept and display text from the character application as part of the display. Current GUI toolkits in this category do not support this feature.

According to the developers at Bluestone, future releases of the product will incorporate WYSIWYG integration. Developers will "draw" the desired interface, then import it directly into an application with little or no additional action.

Summary

Onyx removes the costly barrier that prevents many developers from migrating their applications to a GUI environment. Onyx was developed specifically for the application developer who has little knowledge of X Window or Motif. Unlike other tools in this class, Onyx requires very little knowledge of X and Motif. Applications developers and IS programmers can learn the X and Motif protocols over time, while

At a Glance

Product	Onyx Version 1.0
Developer	Bluestone Consulting Inc. 1200 Church Street Mt. Laurel, NJ 08054 (609) 727-4600
Product Description	Development tool that provides Motif GUI support for character applications
Price	
Development Kit	
Single License	\$3,995
Site License	\$9,995
Run-Time	
Single User	\$195
Multiple User/CPU	\$50-250 (volume discounts apply)
Available HP Platforms	HP-UX Release 9.0
Platform Support	X Window; Motif; ANSI standards X3.41-1974, X3.64-1977, X3.64-1979
Technical Support	Phone Support: 8:30 AM-5:30 PM, M-F EST E-mail: Available FAX: Available

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Have you lost data due to power failure?

Have you lost data due to improper shutdown?

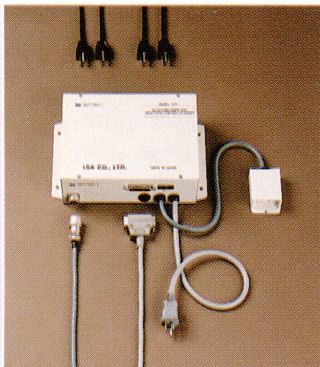
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Number of AC Power Output	4 (CPU 2, Peripherals 2)
Maximum electric Control	15A
Interface	RS-232C
AC Input (V)	90 - 132
Frequency (Hz)	47 - 440
Power Consumption (W)	3
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Weight (Kg)	2.5



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quickly migrating their applications to include GUI functionality.

Onyx' extended escape sequence protocol was developed specifically to complement the standard ANSI escape sequences found in character applications. Some of the sequences used in other tools in this class re-use ANSI sequences, causing a potential conflict when implemented. Onyx avoids these conflicts, and its structure enables it easily to incorporate new support.

Complete documentation is provided for all Onyx commands. The documentation is clear, concise, and complete. Example programs are provided with the tool, providing illustrations of Onyx capabilities. Bluestone also provides technical phone support for Onyx. The technical staff can answer difficult questions or solve complex problems should experimentation and documentation prove inadequate.

Onyx provides a cost-effective solution to the problem of migrating character-based applications to GUI platforms. Its complete support of Motif provides the flexibility and functionality that will allow developers to implement a full-featured GUI that will prolong the life of an application or product at a fraction of the time and cost of a complete rewrite. ■

As director of business development for International Computaprint Corporation, James P. Royman is responsible for new products and services and the coordination of major account activities. Prior to joining ICC in 1992, he served as director of software development at SunGard Recovery Services, manager of product development at the Arbitron Company, and as project manager at ADP Brokerage Information Services.

LRom Font and Underscores

FOR LASERROM/UX (both A.0x.xx and B.0x.xx versions), the default font for type-in boxes and labels for buttons/menus is "variable." This font displays the underscore character to a left pointing arrow. To avoid this problem, specify an alternate font from the ISO font list in /usr/lib/X11/fonts/iso_8859.1/-75dpi. While other fonts might be specified, the iso_8859.1 directory is recommended by the man page for LaserROM/UX. The 100dpi directory is used for higher resolution displays but usually contains a 1:1 list of font names found in 75dpi.

Note: The directory must be searched on the display server and not the machine where the LaserROM program is executed (unless they are the same). Fonts are always provided by the display rather than the host where LaserROM is executed. The closest match to "variable" is the helvb## font where ## might be 08, 10, 12, 14, 18 and 24. In the /usr/lib/X11/fonts/iso_8859.1/75dpi directory, the name is shown as:

```
helvB14.scf
```

but the resource would be set in LAserrom or LRom as "helvb14". The LAserrom or LRom files are in /usr/lib/X11/app-defaults. This same resource

may also be set in \$HOME/.Xdefaults, your .xrdb file, or in the LaserROM runstring with the -xrm option. The box below left shows the assignment string for /usr/lib/X11/appdefaults/LAserrom or LRom.

The larger numbers (i.e., 14, 18, 24) produce a larger font. Notice that the resource name for the type-in fields is called fontlist while the font used to display text from a document is called font. To maintain alignment of text, the font resource should always be a fixed spacing font (not proportional such as helv* or tim*).

More CDROM Titles of Interest

Health and Medical Care Directory is the title of a new CDROM from Sony. It lists names and addresses of medical organizations by geographic areas. *Publique Arte* is the clever title for public domain clipart, all in PCX format. *RBBS in a Box* contains 12,000 public domain software programs. These three are available for \$69.99 from Damark (retail price is listed at \$99.95 each).

Also from Damark, *North American Indians* (\$49.99) and the *CIA World Fact Book* (\$39.99). Damark is at (800) 827-6767.

CD-I Shows More Products

CD-I (CD Interactive) was introduced this year amidst a flurry of competing technologies such as PC-based multimedia and CD-TV, and the always popular Sega TV games. One of the newest products is the Memorex

LAserrom	LRom
=====	=====
LAserrom*fontList: helvb14	LRom*fontList: helvb14
To set the resource at runtime:	
laserrom -xrm " LAserrom*fontList: helvb14" &	
or	
lrom -xrm " LRom*fontList: helvb14" &	

MD-2500, a \$700 Video Information System (VIS) that comes with the *Compton's Encyclopaedia*, and uses software that is based on Windows 3.1. While not a full-blown PC, the VIS unit has a Save-It cartridge used to create and store "bookmarks" which can be used to mark your place in a specific document.

The VIS unit has a remote control that looks very much like a video game, but the manufacturer has more than just games targeted for this player. There are a number of learning and information titles scheduled for the 1993 catalogue.

Phillips is offering their CD-I machines with the added feature of PhotoCD compatibility, the latest product from Kodak. Details on full Photo-CD features such as multi-session capability haven't appeared in their ads yet. Phillips is offering a portable 80386 unit with a color screen and built-in speakers. Even a pointer is part of the system, which plays audio CDs, CD-I, CD-XA and Photo CD. Although it has almost everything needed for a laptop computer, it is designed for reference and presentation rather than conventional computing. Retail price is about \$1,995.

The new Sega-CD and Genesis console are also moving into the realm of home information systems and even dabbling in music. The Sega unit will play audio CDs with a variety of on-screen controls, plus it plays and displays CD+G (audio with graphics), the new audio plus pictures disc as well as a popular karaoke format. Turbo Technologies is offering a \$299 TurboDuo unit that will accommodate both game cartridges as well as CDs. Sega and JVC also have similar (but incompatible) game systems with the added feature of sing-along *karaoke* discs. They have mic inputs for budding singers and a lot of party fun.

New CD Handbook

Everything you'd ever want to know about CD formats is contained in the latest edition of Ken Pohlmann's book, *The Compact Disc Handbook, 2nd Edition*. Emerging formats include CDROM-XA, CD-I and even the newest Sony Mini Disc, 2.5-inch of audio with a new data compression technique to provide long play times. There are chapters on the encoding methods and on how the CDs are manufactured, and there is even a section on CD players. \$34.95 in paperback from A-R Editions, Inc., 801 Deming Way, Madison, WI 53715.

Sony's Portable CDROM Player

What's two pounds and packed with multi-megabytes of data? Sony's Portable CDROM-XA Player will play audio CDs, CDROMs, and CDROM-XA format discs. The player is stated to be MS-DOS compatible with a gray scale display and an operating system loaded into onboard ROM. The \$1,000 unit will offer multimedia travel courses, business and even language training.

Street Prices for PhotoCD Services

Just how expensive is a PhotoCD disc? The ads quote about \$20 but that isn't the entire story. The \$20 price is for a roll of 24 exp film, developed and transferred directly to the disc. A single roll of 12 exp film is about \$13, and a 36 exp roll is around \$29.

Photo dealers can process either color negatives or slides, with mounted slides or optional prints available as part of the services.

Since the disc can hold 100 pictures, it makes sense to fill up the disc before buying another disc. This can be done at the same time by having multiple rolls transferred. The source film can be

either color slides or color negatives (the computer will reverse the image). Typical street prices:

10-24 images = \$1.80 each
25-49 images = \$1.70 each
50-74 images = \$1.60 each
75-100 images = \$1.50 each

So a completely filled PhotoCD could run about \$150 or so. Remember that today, typical computer CDROM drives that support PhotoCD are limited to single-session discs, that is, all images are recorded at the same time. Multi-session or adding images to an existing disc works with PhotoCD players but no CDROM drives have been announced to support multi-session yet.

PhotoCDs may also be duplicated for around \$1.10 per image or a full disc (100 images) for \$100. Although the costs are about two or three times the price for typical snapshots, the resolution on PhotoCD is very high (compared to typical desktop scanners), so the additional cost is not that high. Many desktop publishers may find PhotoCD the ideal format for stock shots, allowing thousands of photos to reside in a disc file, ready to preview and incorporate into a document in a few minutes.

Phillips CD-I Player Features

Phillips is presenting their new CD-I machine with support for audio CDs, CD+G, PhotoCD, and CD-I formats. The player will accept standard 5-inch CDs as well as the smaller 3-inch audio discs and features a unique "thumbstick" for moving through the interactive discs. Some of the CD-I titles are:

- **Palm Springs Open:** A great golf game with real images of the links, not just computer-generated...about \$50.
- **Rand McNally US Atlas:** Not only

great maps but a state tour with historic, cultural, and economic information...around \$40.

- **Paint School:** No more poster paints on the kitchen walls! Now kids can color pictures on the TV...about \$20.
- **Jigsaw:** There are 3,000 puzzles (not pieces, puzzles) with simple to advanced patterns...\$40.

Lower Prices on CDROM Drives

The Talon drive, TA-100, is now street priced around \$280 including headphones and an encyclopaedia disc. A higher performance unit with 64K buffering and double-speed transfers, the TA-200, is about \$600 with headphones, an encyclopaedia, *Webster's Dictionary*, and a Game disc.

Alice to Ocean on PhotoCD

Many of you will recognize Rick Smolan as the name of the producer of the popular coffee table books, *Day In The Life* series. These books, richly photographed and replete with comments about the theme, grace many libraries and living rooms across the world.

Rick began working with Kodak and Apple when the design of PhotoCD was in its infancy in 1991, and this partnership has produced one the finest examples of the possibilities for this medium. *From Alice to Ocean: Across the Outback* is the title of a photographic essay book on Australia that will retail for \$50, but also includes two discs: a PhotoCD disc with audio annotation and an interactive disc that runs on the Mac.

The result is a photographic masterpiece for both PCs and Macs, allowing the viewer to see colors and images along with narration that can only be described as breathtaking. *From Alice To Ocean* went on sale in bookstores December 1, 1992

and contains both CDs so PC and Mac users can marvel at the images.

More on PhotoCD

An interesting note in the PhotoCD campaign: Kodak is reporting that PhotoCDs are more durable than audio or CDROM discs. According to Kodak, the dyes used in the PhotoCD will last as long as color papers (prints). However, don't throw your negatives away just yet—color negatives are reported to outlast all CDs.

The standard needed to play back a PhotoCD is CDROM-XA, mode 2, although this is not 100 percent guaranteed. As mentioned before in *ReadOnly News*, there are no CDROM drives that can read multi-session discs. Multi-session discs have additional images appended to the disc, necessitating some hardware and/or driver support to read past the end of the first session.

To obtain compatibility information on the latest CDROM drives, call Kodak at 800/242-2424, ext 77. It appears that many CDROM drives can be made to work with single-session PhotoCDs by obtaining a new driver from the manufacturer. Sony, Phillips Electronics, Pioneer, and Toshiba are all planning to ship PhotoCD-compatible units this year with multi-session driver upgrades just around the corner. Drives that carry the PhotoCD logo are guaranteed to be PCD-compatible.

At right is a summary of the five different images that are stored on standard PCDs.

On PhotoCD, these files are stored in a proprietary compressed format with the largest image (poster) requiring about 30 Mb after pulling one file from the disc. *Whew!* But the resolution is phenomenal.

There are two PC programs that support PCD format directly: Corel-Draw's Mosaic version 3.0B, and Picture-Publisher version 3.1, both for Windows on the PC. For Macs, Kodak's Photo CD Access program is all there is for now. Kodak's Photo CD Access is also available for Windows. Many software manufacturers are planning support, including Image-In-Color and Halo-Desktop, and for the Mac, Apple plans to add PCD to QuickTime GX. Aldus plans support for PCD for all of its products (i.e., PageMaker and other Aldus artwork programs).

The Kodak Photo CD Access doesn't allow printing directly but you can view the images and export them to graphics file formats such as BMP (Windows bitmap), EPS, PCX, RIF, TIF, and WMF.

Kodak recommends a 486 computer with a 24 Mb swap file for Windows and at least 8 Mb of RAM to run its Photo CD Access. For the Macs, you'll need a MAC II on System 7 with 8 Mb or more of RAM. For both PCs and Macs, 24-bit video is recommended for maximum benefit.

Photo lab prices are starting to show up with a wide range (3:1) for processing services. One lab reports \$3.00 per image flat fee while many photo shops report as low as \$29.00 for a 36 exp roll and as little as \$1.80 per image to add more pictures.

STYLE	RESOLUTION	PCD FILESIZE
Wallet	128 x 192	82.5 Kb
Snapshot	256 x 384	99 Kb
Standard	512 x 768	1.2 Mb
Large	1024 x 1536	4.7 Mb
Poster	2048 x 3072	19 Mb

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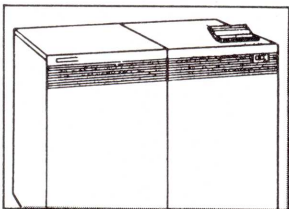
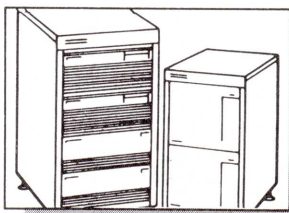
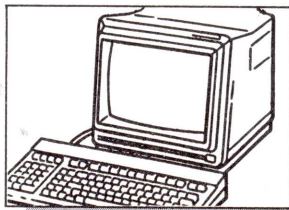
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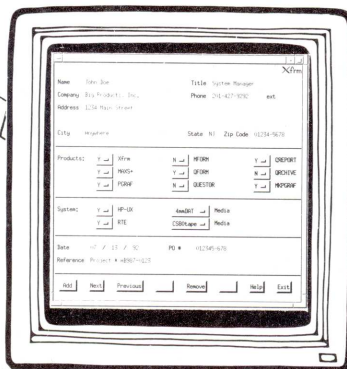
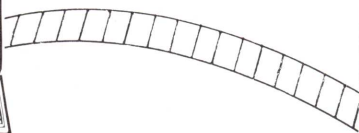
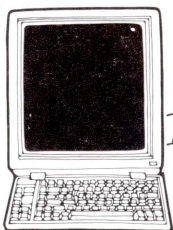
CIRCLE 18 ON READER CARD

Make Your Own Photo CDs?

Kodak has announced a low-cost Photo CD writer that will allow small producers to create their own in-house PCDs at twice the speed of conventional CD writers. The PCD Writer 200 retails for about \$5,900 and supports multi-session recording. With the \$1,900 software package (not included with the player), DOS, Windows, Mac, and UNIX systems can create their own PCD media. Each blank disc runs about \$25, about half the cost of typical CDROM write-once media.

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CIRCLE 07 ON READER CARD

Bill Hassell, HP-UX System Support,
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by Paul Gerwitz

"GOOD AFTERNOON MR. SMITH, my name is B. Nice, from Slick Software Inc. My company has just announced a new product that will meet all your needs for system administration in your workstation environment. This package, called 'DOES-IT-ALL,' is an open, standards-based product that will improve your productivity several orders of magnitude and save your company lots of money, and it runs on every platform you can imagine. Could I send you some more literature and a demo CDROM?"

Does this sound familiar? Have you found yourself bombarded lately with sales pitches for system administration tools, more often in the last year? It seems like that's all anyone is interested in these days. But when you get right down to it, the single highest cost in computing in the 1990s is support. It wasn't so long ago that a system was purchased solely on the basis of price/performance or software functionality.

Today, five-year cost of ownership is one of the key measures upon which platform decisions are made. As the trend of moving mission-critical applications from mainframes to distributed client-server systems continues, providing a model for managing this new environment becomes much more important.

What I'm seeing is an increasing need in the HP community for ways to meet these challenges. At last year's INTEREX conference, the suggestions I received for improving the Contributed Software Library (CSL) were almost exclusively in the system management arena. The dilemma for INTEREX is how to meet the needs of our members in a way that adds value. It is not just a problem that is addressed through the CSL, but also in many other areas of INTEREX. The

technical programs at conferences also play a pivotal role.

The CSL idea has always met the needs of the members in a way that improves their computing environment. But the traditional means of contributing software to the CSL and then utilizing that software in your environment don't seem to work as well in the HP-UX world. In the classic RTE/MPE sense, the potential for solving a problem rested solely on the end user's shoulders. If a function needed to be implemented, you usually created your own, or used something from the CSL. You could deal with yearly releases, since project life-cycles were much longer and the planning was easier.

But in this brave new world, money is tighter, time frames are shorter, and integration is the key. We are buying instead of building, taking third-party packages and integrating our data and processes into them. This leaves far fewer developers to roll their own tools and more people looking for solutions that are not being contributed.

More and more vendors are coming forward to fill in these holes, which diminishes the potential pool of contributions further. Does this mean that there are no sources for contributions for the CSL? Hardly.

By being a user of HP-UX, you have joined a much larger community of users than you could imagine, the community of "UNIX." This community is so large and vast that it is very difficult to comprehend sometimes. It is from this community that the bulk of the CSL contributions will come. But this community will not just send things in. It is up to those of us who are plugged into this community to make sure that useful items are shared within the INTEREX

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community. This approach will necessitate some changes in the way the CSL is produced and distributed. What these changes will be has yet to be discussed fully. I welcome your input and suggestions.

CSL Release 33xx should be on the streets by the time you read this. Due to the lead time for this article, I cannot give you an indication of what will be included in the release since we are still in the process of building it today (it's February, and there's lots of snow on the ground still). It looks like it will be jam-packed with lots of useful contributions that I'm sure you will be able to use. I hope we can talk about them next time. ■

Paul Gerwitz is chairman of the CSL/ HP-UX committee and is a system analyst at Eastman Kodak Company in Rochester, New York. He can be reached at (716) 477-3067 or e-mail at: gerwitz@interex.uucp or gerwitz@kodak.com

HP-UX Systems Administration

by Chris Curtin

I HAD PLANNED on this month's column being about installing and updating HP-UX 9.0. Unfortunately I have been extremely busy the past two months and have not been able to get around to it. In fact the 9.0 manuals and distribution for all my systems are being used as a makeshift table to hold my "real" work. I hope to have some 9.0-specific information in the next couple of columns.

With my busy schedule (by title I am a software engineer, not systems administrator) I have been lucky that nothing has really gone wrong on any of my systems. I did have an extremely annoying problem and that is what I will discuss this month.

An Unexplainable System Load

Did you know that your Hewlett-Packard 9000 Series 800 has the ability to redirect console control from the system console to a secondary port? I did not, at least until I started tracking down an unusually high system load.

One weekend, while doing backups, I rebooted my 827 and noticed that I had a constant 1 job waiting to be executed, regardless of who was logged on or what processes were being executed. I had a second 827 that did not have this problem so I assumed that some process that was being started automatically from `/etc/rc` was taking a lot of resources.

I edited the `/etc/rc` file and stopped loading all the license managers and support tools. I rebooted and the system still had a 1 load. About the same time I received e-mail from one of my users. He was trying to connect to the 827 through a modem and data-switch. He said that every time he attached to one of the ports he failed to get a login prompt.

Knowing that the data-switch had four dedicated ports for the 827 and that I

had set aside four mux ports to connect to the data-switch, I began looking at the gettys. The first problem I found was that I could not kill the getty on `/dev/tty0p7`. It also had a `ty` entry from `ps -ef` of '?'. I rebooted in hopes of clearing the port. (Isn't it great to have these problems arise when no one is around? If this had happened during a workday my users would be screaming for my head! I had already rebooted four times that morning.)

However, this time, when the system booted, instead of getting the console login prompt, I was greeted by a `CM>` prompt. This is a problem that happens very rarely, but usually at weird times like this. I have not been able to determine why this happens.

What I usually do at this point is type `'co'` and get a login prompt. However at the bottom of the screen was the line: `'REMOTE: enabled inactive multiple'` among some other things. Now, I know that the `REMOTE` entry should say `'disabled'`. (This was relayed to me by the previous administrator. When asked why, he said, "Because." You could tell that he had two little kids.)

I typed `'he'` at the `CM>` prompt and received a list of the commands for the remote console. See Figure 1 for a complete list. I typed `'ur'` to unlock the remote. This changed the `REMOTE` status to `'disabled'`. I went to console mode and let the system finish booting. When the system finished booting the constant 1 load was gone and the getty for `/dev/tty0p7` was working properly.

What happened? I called the Response Center and was told that the hardware for port `/dev/tty0p7`, which maps to port 7 on mux 0, would not allow the getty to finish initializing because the physical port was designated a remote console. When the getty could not initialize,

FIGURE 1 *Remote Console Help Screen*

```

CM> he
NI016 Access Port - Revision D1.91 - 3125

CA - Configure system remote support modem port.
CO - Enter console mode.
CS - Copy screen from local console to remote console.
DI - Disconnect line to remote console terminal.
DR - Disable access by a remote console terminal (enable session
access).
DS - Disable display of system status line during console mode.
ER - Enable access by a remote console terminal (disable session
access).
ES - Enable display of system status line during console mode.
HE - Display this screen.
LR - Lock remote (disable modem access).
RS - Stop all processing, initiate SPU self test, load software
from load device if enabled for autoboot.
SE - Transfer remote terminal from console/control to session
mode.
TA - Initiate Access Port self test.
TC - Transfer processor execution to operating system specific
routine.
TE - Send message between the local and remote console termi-
nals.
UR - Unlock remote (enable modem access).

```

it continually waited until the hardware was ready, thus the constant 1 load.

Remote Consoles

Investigating further I found that HP has what they call a "Remote Console" that works in parallel with the standard system console. All I/O occurs on both consoles. In the older CIO-based 800 Series the remote console is a dedicated port that requires special hardware to function. In the newer HP-PB machines, like my 827, port 7 on mux 0 is used as both a remote console and a normal RS-232 port.

The reason for the remote console is to allow someone at a different location to perform systems administration tasks as though they were on the system console. Used primarily for HP Response Center support, this feature can also be useful for systems administrators who support several geographically dispersed systems.

HP offers a service that makes them your systems administrator. They supply a modem that is attached to the remote console port and use software that tracks HP-UX-specific information that helps them diagnose and prevent problems.

It is called HP Support Watch. Unfortunately, this is all that I know about this service. Call your Sales Rep for more information.

We do not use Support Watch, but the concept of a remote console is very attractive for an administrator who must support multiple computers at multiple locations. A quick overview of the remote console commands will show you some of the features available.

Remote Commands

On the older CIO machines the remote console is already configured, but on the newer HP-PB machines you must configure the remote console from the console. The first thing to do is deliberately get a CM> prompt. This is accomplished by pressing Ctrl-b at the login prompt on the system console. A line similar to the following will appear at the bottom of the screen and you will be at a CM> prompt:

```

RUN F01F  REMOTE: disabled
              inactive multiple ACCESS
                                   FAULT:00

```

The RUN and ACCESS FAULT items provide information about the run state of the hardware. Unfortunately I do not have any information about these. The RUN F01F seems to be the default for 8x7 computers, but I can't guarantee it.

The 'he' command displays the help screen displayed in Figure 1.

The 'ca' command displays the configuration of the remote console and prompts you to change the values if necessary. The configuration parameters are:

1. The Bit Rate, which can be between 300 and 19,200 bits per second.

2. The protocol type, either CCITT or Bell.
3. Protocol-specific configuration. For CCITT you are asked to select the rate.
4. The Systems Identification. This is usually your system handle or blank.

The 'co' command switches from the remote console (CM>) prompt to the normal system console mode. This is allowed only on the console wired to port 0 of mux 0.

The 'cs' command allows you to copy the screen from the system console to the remote console. This allows the user on the remote console to see the current state of the system console when the remote console has just been enabled.

The 'di' command disconnects the modem from the remote console. This is how you 'log off' of the remote console.

The 'dr' command disables the remote console. This prevents someone from using Ctrl-b on the physical remote console to make it a console.

The 'er' command enables the remote console. This allows someone to use Ctrl-b to become a console.

The 'es' command displays the RUN status on the system console at all times. The 'ds' command disables this feature.

The 'lr' command locks the remote console port. This prevents the modem from working and the getty from starting even if the port is disabled.

The 'rs' command resets the computer. **BE VERY CAREFUL USING THIS COMMAND!** This command will stop all processes, initiate an SPU self test, and reboot the computer. This command DOES NOT call /etc/shutdown or /etc/reboot and it does not have the same effect as a power failure. This should be used only in extreme cases when the system needs to be cycled and

cannot be shut down cleanly.

The 'se' command transfers the system console from the default location to the remote console. This command can be executed only by the remote console.

The 'ta' command is used to test the remote console port. It returns status information about the remote console.

The 'tc' command forces the system to panic. It passes control to a function within the kernel that flushes memory and then dumps a core file. A nicer way to shut down than 'rs', but it should only be used by HP. This core file is an image of the system at the time the 'tc' command was executed.

The 'te' command allows passing messages between the local and remote consoles. This is very useful when supporting a remote system and there is someone on-site to help you.

Finally the 'ur' command unlocks the remote port. This allows both modem access and the getty to start if the remote console is disabled.

The problem that I had with the getty not starting was resolved by doing two things: First I disabled the remote mode, using 'dr'; then I unlocked the port using 'ur'.

As I said earlier, I hope to have some HP-UX 9.0-specific information available in the next couple of columns. As always I am looking for suggestions for future columns and feedback on the current column. ■

Chris Curtin, a software developer for Bradley Ward Systems, Inc. in Atlanta, Georgia, specializes in device driver development for factory automation on the HP 9000. He can be reached via e-mail at: gatech!twittsend!bwilab3!chris.

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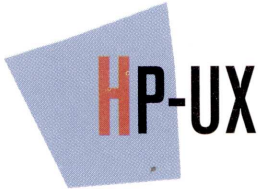
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by David L. Totsch

Trading Pesky File Names Using UUCP and Mail

THE ABILITY TO TRADE electronic mail and files between systems has long been a strong suit of UNIX. Being able to attach a modem to your box and bring up 'uucp' is very handy. Problems can arise, though, when you need to transmit a binary file or exchange a large amount of information. Let's explore some of the methods we can use to make life easier.

First of all, transmitting a binary file can be risky. This includes data files as well as executables. Not only are the files getting to be large, but 'uucp' may damage the file during transmission because it contains something other than printable ASCII characters. More specifically, mailers tend to cough up messages containing binary information on a regular basis. To get around this, you can encode the file to printable ASCII characters with 'uuencode'. Here is the proper syntax to encode the file *a.out*:

```
uuencode a.out doit > doit.uuenc
```

The file *doit.uuenc* will contain the encoded version of *a.out*. When *doit.uuenc* is decoded, it will create a file named *doit* with the same permissions as the original *a.out*. To restore the file, the receiver merely needs to execute:

```
uudecode doit.uuenc
```

Since 'uudecode' ignores leading and trailing information that may be added by mailer programs, it is very handy for mailing binary files to users. The receiver merely needs to save the message in a file and run 'uudecode' on it. The only drawback is that 'uuencode' will expand a binary file by approximately 35 percent.

If you are limited to 2,400-baud (or even lots of 19,200-baud) traffic, expanding a file before transmitting it is probably not what you had in mind. Try compressing the file before you encode it:

```
compress a.out  
uuencode a.out.Z a.out.Z > a.out.uuenc
```

The file you transmit will probably be smaller than the original binary file and the mailer programs will still be able to handle it. Be sure to name the decoded file so that the receiver understands that the decoded file is in compressed format.

Although 'uucp' can deal with multiple files and directory structures, there is a method that may use your modem resources more efficiently: create a 'tar' or 'cpio' archive file. Instead of directing the output of 'tar' or 'cpio' to a tape device, direct it to a file on a file system that will have enough room to accept the archive (typically /tmp or /usr/tmp). Compressing these archive files will reduce the transfer overhead. Also, the file can be encoded for transmission as a mail message.

If you want to exchange secrets with someone, you can use 'crypt' somewhere in the sequence to keep people honest. Remember to exchange the file's key under separate cover. For example, I have the directory "stuff" that I want to send in a secure fashion to a friend of mine:

```
find ./stuff | cpio -oc | crypt goodkey1 |
compress > send_stuff.Z
```

To unpack it, my friend needs to execute:

```
zcat send_stuff | crypt goodkey1 | cpio -icdv
```

This will create the directory "stuff" and restore the contents. Keep in mind that my friend and I exchanged the key "goodkey1" over the telephone.

If you decide to use one of the above methods, it is wise to make sure you can unpack the file yourself before you send it. This way, you will have no problem describing to the receiver exactly how to unpack the transmission. Also, consider the

technical expertise of the receiver. Will they be more familiar with saving a mail message and decoding it than with receiving a uuencoded file and running a long command string against it? The extra transmission time may be worthwhile if the receiver will not need 15 minutes of support to unpack the file successfully.

No matter how you transmit a file, it is always wise to have the receiver verify the transfer. Send the receiver the checksum ('sum' or 'cksum') and word count ('wc') of the file you transmit. After they receive the file, have them compare the checksum and word count from their file with what your system reported. They should match exactly. If you send the file in a mail message, you will need to compare checksums and word counts on the unpacked versions. ■

David L. Totsch is lead technical specialist at LaSalle National Bank, Treasury Systems, Chicago, Illinois. He has more than six years' experience with various flavors of UNIX. Totsch serves on the Board of Directors for /usr/group/chicago, the local affiliate of UniForum. He is also on the steering committee for the Chicago Regional Users Group of HP computers (CRUG).

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HP-UX CSL Release Update

May '93 is the scheduled date for HP-UX CSL's new release. These fully tested and documented applications and utilities have been created to target specific challenges HP-UX users face. The release will feature:

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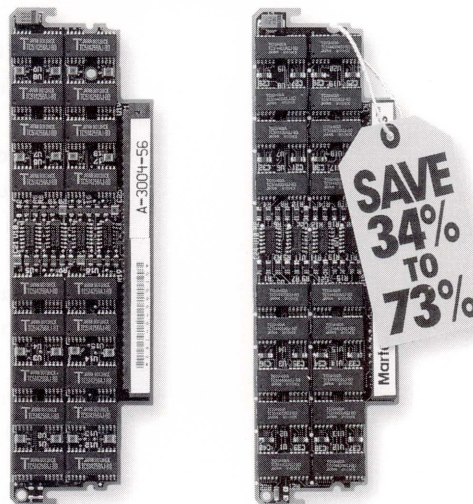
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CIRCLE 14 ON READER CARD

by *Larry Headlund*

Wcl, an X Programmer's Tool: Part II

LAST TIME I SANG the praises of Wcl (Widget Creation Library) without going into details. Briefly, GUI programming raises challenges such as strong aesthetic components, user customization expectations, rapid prototyping requirements, and portability issues. Wcl is a response to these challenges that I have found very useful.

The Core Idea X resource files can already be used to describe much of an applications appearance. Fonts, colors, label strings, and text values can be set in a resource file and modified without recompiling the program. What you can't do in the resource file for a standard X program is:

- create new widgets
- describe parent-child hierarchies explicitly
- attach callbacks.

If you could do all of this outside the program, then only the callbacks themselves would be coded and the rest of the application would be in the resources. This means you could develop, prototype, debug, and customize without ever recompiling.

Is this possible within the X Resource Manager? As you may have noticed when writing resources files, `xrdb` and `xrm` don't care about spelling. You can write `Myprog*mywidget.fubar: My Name` and it will be loaded happily into the resource database. Nothing will happen when your program runs, but the string will be stored in the database. Therefore, if your program could interpret resources to create new widgets, attach children, etc., then the X resource database would handle storing and accessing of these new resources. Wcl does just that.

An Example

Figure 1 (see next page) is the code for the main loop of a program using Wcl. Hidden from view is the code from Wcl which does all the widget creation and the details of any application-specific code (the call to `registerMyCallbacks()` brings in the application-specific code). Notice that no widgets are created and no resources are read explicitly in this code fragment. Three lines are of particular interest:

- **Line 8:** `MyprogRegisterMotif(appContext)`
brings in all the Motif-specific code
- **Line 9:** `registerMyCallbacks(appContext)`
brings in any application-specific code
- **Line 10:** `WcWidgetCreation(widgetTopLevel)`
creates all widgets

If we compile this program, linking to the X and Motif libraries, the Wcl library, and the application code and produce an executable we will call with great originality `myprog`, we have an application which does precisely nothing. We are only half finished because we haven't written the resource file.

FIGURE 1 *Code for Main Loop*

```

main(argc, argv)
int argc; char *argv[];
{
1   XtAppContext  appContext;
2   Widget        widgetTopLevel;
3   widgetTopLevel = XtVaAppInitialize(    &appContext,
4                                           "Myprog",
5                                           NULL, 0,
6                                           &argc, argv,
7                                           NULL, NULL, 0);
8   (void)MyprogRegisterMotif(appContext);
9   (void)registerMyCallbacks(appContext);
10  (void)WcWidgetCreation(widgetTopLevel);
11  (void)XtRealizeWidget(widgetTopLevel);
12  (void)XtAppMainLoop(appContext);

```

Figure 2 (right) is the resources file for the canonical "hello,world" example as a label. If we issue the commands:

```
xrdb hello.ad; myprog
```

a Motif window with the label widget appears. Having extracted all the fun we can out of this, we construct another example. This time we want to display a window with a push button which, when pushed, exits. We do not modify the code and we do not recompile; instead we write a resource file like Figure 3 (right) and type:

```
xrdb push.ad; myprog
```

and we have a complete "suicide application." Please note this bypasses completely the code-compile-test cycle.

Why Use Wcl Instead of C?

Not having to compile is just one advantage. A second big advantage for me is that the Wcl syntax seems to make a lot more sense and is easier (and more bug-free) to write than pure C code. By making it more natural to put most of the user functionality in the resource files it helps me to keep a "widget orientation" in my development. That is, if there is a scheme I have in mind and it is difficult to implement using Wcl, then that sets off an alarm that maybe the whole approach

should be reexamined.

With Wcl, most of the personality of a program is in the resource files. That means that with a little care you can use one executable to perform many tasks. A simple example would be a menu for a user with each push button executing a shell command. (See Figure 4, right.) Note that this is the same executable we have been using all along. This means that the same executable wears different faces and performs many tasks. The advantages of this are as follows:

- You have to debug only one program. (You still may have to debug resource files but I find that much easier.)
- One executable saves disk space and with shared text precious RAM as well. If UNIX was a plot to sell disk drives, X is a plot to sell RAM.
- Since the text is already in memory, start up time for subsequent executions may be reduced. Frequently used programs (FUPs) would be good candidates for the sticky bit.

Wcl is Very Easy to Customize

Customizing Wcl usually means adding your own callbacks. After you have written your callbacks, as you would for any program, making Wcl aware of it involves just one line of code for each callback:

```
WcRegisterCallback(appContext, "myCB", myCB);
```

FIGURE 2 *Resource File hello.ad*

```

Myprog.wcChildren:          mylabel
Myprog.*mylabel*wcClassName: XmLabel
Myprog.*mylabel*labelString: Hello World

```

FIGURE 3 *Resource File push.ad*

```

Myprog.wcChildren:          push
Myprog.*push*wcClassName:   XmPushButton
Myprog.*push*labelString:   Push and Die
Myprog.*push*activateCallback: WcExitCB

```


FIGURE 4 *Resource File menu1.ad*

```

Myprog.wcChildren:      rc
Myprog.title:           Menu One: Backup
Myprog*rc.wcClassName:  XmRowColumn
Myprog.rc.wcChildren:   buttonFullSystem,\
                        buttonUsers,\
                        buttonDataBase, \
                        buttonExit
*Myprog*rc.buttonFullSystem.wcClassName:      XmPushButton
*Myprog*rc.buttonFullSystem.labelString:       Full System Backup
*Myprog*rc.buttonFullSystem.activateCallback: \
        WcSystemCB("cd /; find . -depth -print |cpio -oxv >/dev/dat")
*Myprog*rc.buttonUsers.wcClassName:            XmPushButton *Myprog*rc.buttonUsers.labelString:
Users Backup *Myprog*rc.buttonUsers.activateCallback: \
        WcSystemCB("cd /users; find . -depth -print |cpio -oxv >/dev/dat")
*Myprog*rc.buttonDataBase.wcClassName:         XmPushButton
*Myprog*rc.buttonDataBase.labelString:         Data Base Backup
*Myprog*rc.buttonDataBase.activateCallback: \
        WcSystemCB("cd /usr/db; find . -depth -print |cpio -oxv >/dev/dat")
*Myprog*rc.buttonExit.wcClassName:            XmPushButton
*Myprog*rc.buttonExit.labelString:            Exit
*Myprog*rc.buttonExit.activateCallback:       WcExitCB()

```

Your function myCB is now completely equal to the built-in callbacks. For anyone who has wrestled with adding built-ins to some other languages this is refreshing.

You aren't limited to adding functions. You can add new widgets just as easily. You will probably want to add the table layout widget, which is included with the Wcl distribution and serves as a template for any other widgets you might want to add:

```

WcRegisterClassName(appContext, "Table"
                    tableWidgetClass);
WcRegisterClassPtr(appContext,
                  "TableWidgetClass", tableWidgetClass);

```

Some widgets being introduced on the net are even including Wcl bindings and samples with their release. A significant example is the Xbae widget set from Bellcore, which includes a Caption widget and a Spreadsheet widget.

Although its easy to add functions, you will only need to do so for very application-specific purposes. Almost anything you would

want to do (popup screens, unmanage shells, etc.) can be done with the functions provided. As you get in the spirit of things you will start writing your widgets with a strong eye to reusability, a Good Thing.

Wcl is Widget Set Independent

All the examples I have given use the Motif widget set. This is personal taste. Wcl comes with code for binding to Motif, Athena, and Open Look. If you are careful in your coding (no Xm functions in your code), your program can be completely widget set independent. Only the resource files would change to get Motif or Athena.

Wcl Builds on the X Tools

Recall that the behavior of the program depends on the resources for the program. X provides ways of setting these through .Xdefaults file, command line options, the RESOURCE

MANAGER, app-default files, etc. The hard work of managing all of this (from the program's point of view) is all done by X.

Hence restrictions on availability of certain options inside

programs for certain users can be handled completely inside the X resource manager.

Wcl adds functionality to resource files by allowing them to load other resource files. The power of this is best illustrated by an example. I have written an application (using Wcl of course) that implements a hypertext help system. This in turn uses some functions to direct printing to specific printers. All the functions needed are in two libraries with two sets of app-default files. I link these two libraries with a new program. To add the help system I have the resource file for the new program load the resource files for printing and the help system.

What is so wonderful about this? Consider the fact that the list of available printers for this system is in one resource file. To make a new printer available to every application I edit one app-defaults file and then every application knows about it. I happen to write applications for many different countries. Obviously, the on-line help better be in the local language. X already has facilities for loading resource files depending on the national language. X takes care of loading the help file in the correct language, not me!

Conclusion

It should be obvious that I think Wcl is the greatest thing since

sliced bread. There are lots of features I haven't even touched on, like templates and support for other languages (other than C). There are strong rumors that Perl 5.x will have hooks for Wcl. All I can say is that if you do X programming, Wcl is worth a look.

And thank you, David E. Smyth. ■

REFERENCES

"Wcl-Widget Creation Library, Myprog-Motif Resource Interpreter, Ari-Athena Resource Interpreter: An Easier Way to Develop Applications using Motif and Athena Widgets," David E. Smyth, The European X Window System User Group Autumn Conference 1990 Proceedings

"Wcl 2.0: The Widget Creation Library," David E. Smyth, *The X Journal*, Issue 2, Spring 1992

"Wcl1.04.tar.Z," David E. Smyth, contrib

"Wcl2.03.tar.Z," David E. Smyth, contrib

Larry Headlund is president of Eikonal Systems, a software development company specializing in the optical industry and a consultant on UNIX and X. He has been working with commercial UNIX since 1982 and with HP-UX since 1984. He can be reached at lmh@world.std.com or (617) 482-3345.

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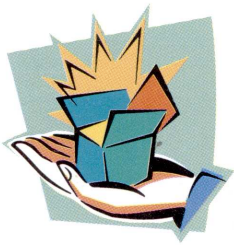
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New Products

New from Delta Microsystems

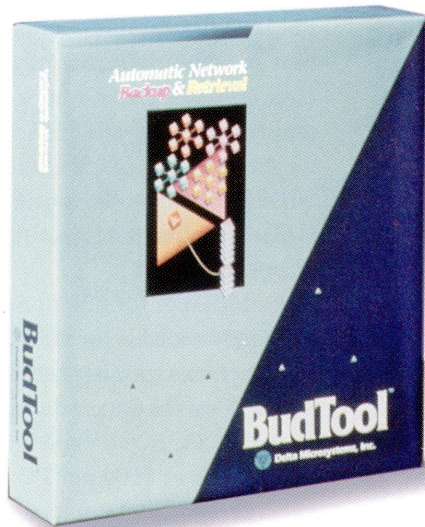
Backup Utility/Tape Jukebox

Delta Microsystems' BudTool 4.1, available for the HP 9000 platform, Series 700, is a software package that resides on a host machine and provides automatic backup for heterogeneous UNIX networks. The product incorporates a windows-based graphical interface to

guide the user through backup and retrieval operations. BudTool is designed to reduce the system administrator's workload by allowing easy file recovery. The product tracks all files and maintains an online file history database, allowing the user to scroll through files and select the file to be retrieved.

BudTool supports 8-mm and DAT tape drives, stackers, and jukeboxes. The jukebox subsystems come complete with custom device driver, BudTool software, and tape jukebox.

Storage capacities range from 24 GB to 580 GB. BudTool is sold separately or with Delta's tape jukebox subsystems. Suggested list price is \$5,395.



**Delta Microsystem's
BudTool 4.1**

File Migration

Delta Microsystems has announced Subsystems, a file migration series that automatically manages the migration of files between magnetic disk and optical libraries. MigTool will be available on HP 9000 late in the second quarter of 1993 and is designed to meet the needs of customers who experience disk space shortages on their networks.

MigTool is reportedly the industry's first UNIX file migration solution available for non-proprietary heterogeneous

environments. With MigTool, users do not have to modify the kernel or existing UNIX file system. MigTool offers MigStat, a graphical utility, to analyze disk usage across the network and automatically alert users to information for managing disk space more efficiently. MigStat graphically displays the number of files on the network, type of files on the network, all users and their disk usage, and individual users and their disk usage.

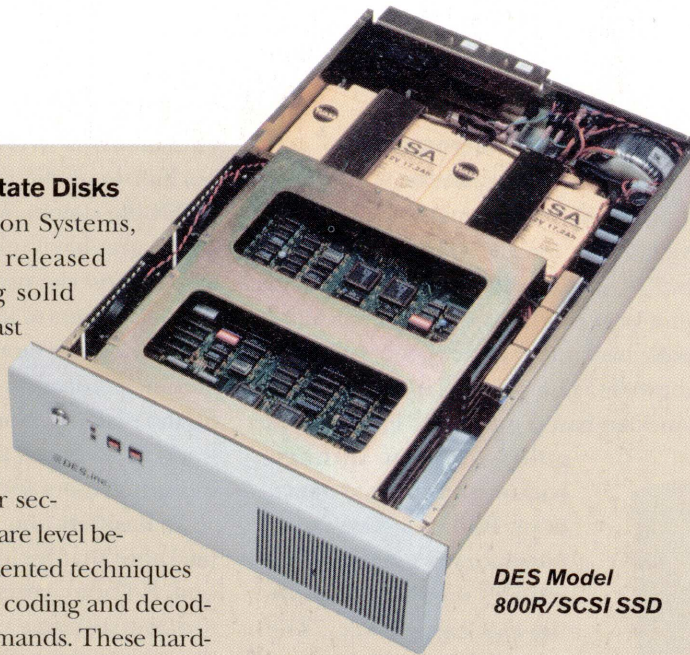
Delta offers four MigTool Subsystem packages that include an HP erasable optical library system, MigTool file migration software, and device driver. These subsystems are sold together providing storage capacities of 10, 20, 60, and 100 GB. Upgradeable paths are available for users who want to start with one model and add more libraries as storage requirements increase. Suggested list price starts at \$32,420.

Live Backups

Delta Microsystems has introduced FreezeFrame for performing live backups of file systems and databases without noticeably degrading system performance. FreezeFrame will soon run on HP 9000 machines. Suggested list price is \$3,000 per server; client software is additional. FreezeFrame backs up data at the device driver level, requiring no kernel modifications. According to the company, it is one of the safest approaches to live data backup because it works with the existing disk device drivers and freezes the disk. While the disk is frozen, writes to that disk are intercepted and the original data is saved to an alternate disk location before it is overwritten. The result: the file system or database can continue to be modified with almost no performance degradation. The saved data is used to reconstruct a frozen

SCSI-2 Solid State Disks

Disk Emulation Systems, Inc. (DES) has released and is shipping solid state disks with fast SCSI-2 interfaces. The DES Model 800R/SCSI SSD is capable of 11,600 1-block I/Os per second at the hardware level because of DES-patented techniques for handling the coding and decoding of SCSI commands. These hardware techniques enable sustained data rates to 10 MB/second with response time never exceeding 50 microseconds. All configurations include a custom online uninterruptible power supply, an internal magnetic backup disk, and battery backup power. The proprietary backup system includes an adjustable timed backup delay that assures maximum data availability plus absolute data security. Capacity is configurable from 32-640 MB and is altered by sliding in additional memory arrays as capacity is required. All of this is contained in a single



**DES Model
800R/SCSI SSD**

5 1/4-inch by 19-inch rack-mount package, fitting in any standard ANSI 19-inch expansion cabinet.

DES's SCSI-2 interface is compatible with all host controllers that support the ANSI common SCSI command set. Field tests in customer sites have demonstrated performance increases from 200 percent to 1,000 percent at the user's terminal.

For more information contact Disk Emulation Systems, Inc., 3080 Oakmead Village Dr., Santa Clara, California 95051. Phone: (408) 727-5497; fax: (408) 727-5496.

Client-Server Data Access

Dynamic Information Systems Corporation (DISC) has announced the availability of its instant data access product, OMNIDEX for Client-Server. The OMNIDEX indexing system can be installed on most major databases to allow users to instantly select and retrieve data based on any combination of criteria. OMNIDEX for Client-Server can now access indices residing on the host machine from any number of PC clients,

including Microsoft Windows and DOS-based programs.

In contrast to other PC-download products or GUI interfaces that provide data translation and user-friendly selection screens, OMNIDEX for Client-Server provides the ability to find and retrieve data quickly from host databases. The product has three basic components: the kernel indices that reside on the host database, the OMNIDEX API that provides the routines necessary to communicate client queries to indices and retrieve records, and the communications link from client to server. OMNIDEX for Client-Server uses PPL from Walker Richer & Quinn for the communications link.

OMNIDEX for Client-Server is immediately available for HP 3000 and HP-UX machines running IMAGE, RMS, or Oracle. Cost for the product ranges from \$9,000 to \$57,500 for the host machine and as little as \$100 per PC in quantity. DISC also provides implementation consulting. For more information contact DISC at (303) 444-4000.

New from Unison-Tymlabs

Maestro D.01

Version D.01 of Maestro, Unison-Tymlabs' MPE-based batch job management facility, adds the ability to control batch processing on HP 9000s networked to HP 3000 systems, support for the TCP/IP networking protocol, and several job control enhancements.

Maestro supports mixed MPE/HP-UX networks using a client-server model, with the scheduling client running on an HP 3000 and job-launching servers running on HP 9000s. Operators can track and control jobs across a network of linked CPUs from one central HP 3000 console. Inter-CPU and inter-platform

view of the disk for the backup utility. FreezeFrame can be used with the client's existing backup utility or with Delta's BudTool. In either case, backups need not be restricted to non-operational hours.

Delta's products are sold by Peripheral Devices Corporation. PDC has offices located throughout the United States and is equipped to handle all national and international sales. Contact Delta at (510) 449-6881 for the location and phone number of local PDC offices.

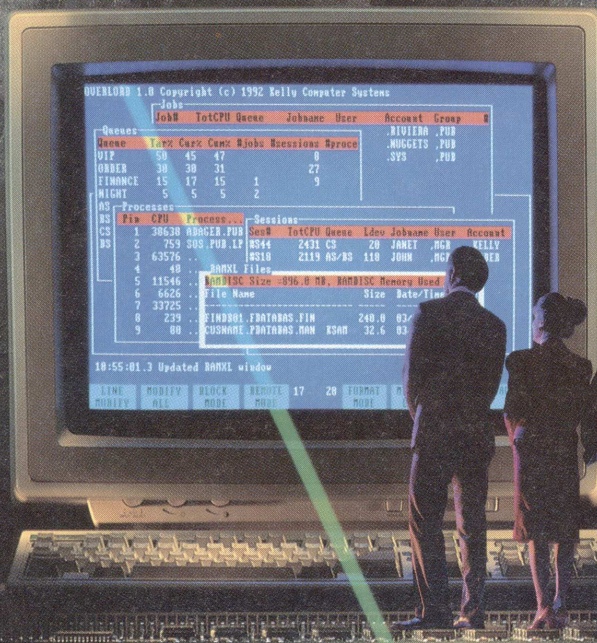
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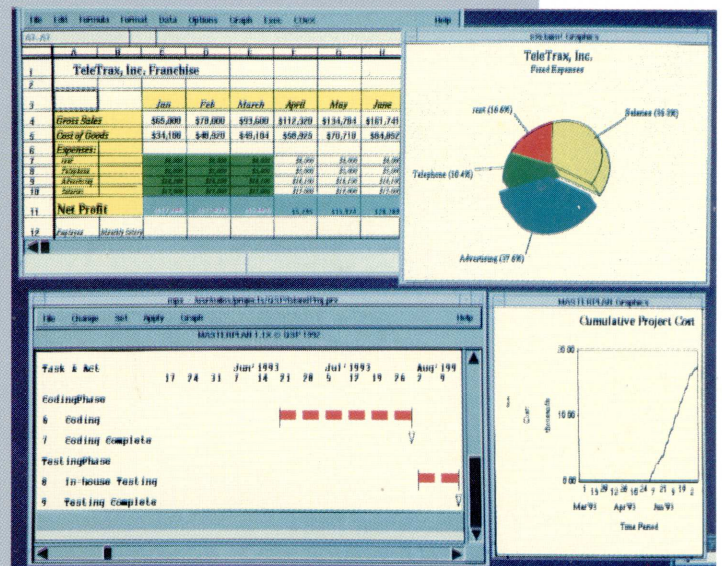
Spreadsheet and Project Management Software

Island Graphics Corporation has announced that it has acquired the eXclaim! spreadsheet and MASTERPLAN project management software products from Quality Software Products (QSP) of Culver City, California. Island is now shipping the QSP products and will release Island versions in the second quarter of 1993. Island Graphics is now shipping eXclaim! and MASTERPLAN for HP 9000 Series and other UNIX platforms.

eXclaim! is a graphical spreadsheet program that lets users analyze and chart data in three-dimensional pie, bar, stacked bar, line, and multiline charts. Lotus 1-2-3 users can import .wk1 worksheets into eXclaim!, and use 1-2-3 macro commands. eXclaim! features an optional front end to Ingres and Oracle database systems, letting users extract selected data into a worksheet by forming industry-standard Standard Query Language (SQL) queries with the click of a mouse. Users can also use eXclaim! as a database data-entry tool.

MASTERPLAN is a graphical project management program that can track the progress of up to 10,000 activities and resources. MASTERPLAN provides easy-to-use project management tools, including critical path management; Gantt and PERT charts; resource allocation, costing, and leveling; scheduling; and query support. Users can create 14 graph types, including 3-D pie, bar, stacked bar, and commodity charts. The activity screen displays a Gantt chart of activities and resources and automatically computes and highlights the critical path for each. The Resource Screen monitors resources such as consumable and nonconsumable items as well as personnel. The Calendar Screen displays a project calendar and is used to specify working and nonworking days for up to 10 years. It also displays a resource calendar that tracks the activities of relevant personnel. The Network Screen provides a graphic view of activities.

Island is shipping eXclaim! for \$495 (list). Island is shipping MASTERPLAN for \$995 (list). Island products are distributed in the United States by Access Graphics, Ingram Micro, and Merisel. For more information about Island Graphics products, contact Island Graphics at (415) 491-1000 or (800) 255-4499, or contact your local reseller.



**eXclaim! and
MASTERPLAN**

dependencies are resolved automatically.

Version D.01 now allows frequently used commands or files to be copied into a job stream, creating a macro-like functionality. Maestro also can check for missing dependencies when compiling a job production schedule and provides a standard list facility (like that offered

by MPE on HP 3000 systems) for HP 9000 scripts. When recovery is required, users can rerun a job either from the beginning or from a specified step. Users can abort MPE or HP-UX jobs from a local or central console and can now be given the capability to control the processing of their own jobs.

Maestro D.01 runs on MPE V, MPE XL Version 2.1 or later, and HP-UX Version 8.0 or later.

Maestro/UX Release

Maestro/UX, a batch job management system for HP-UX, can schedule jobs according to customized business calendars

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StorComp's RAID 7 Storage System

RAID Data Storage

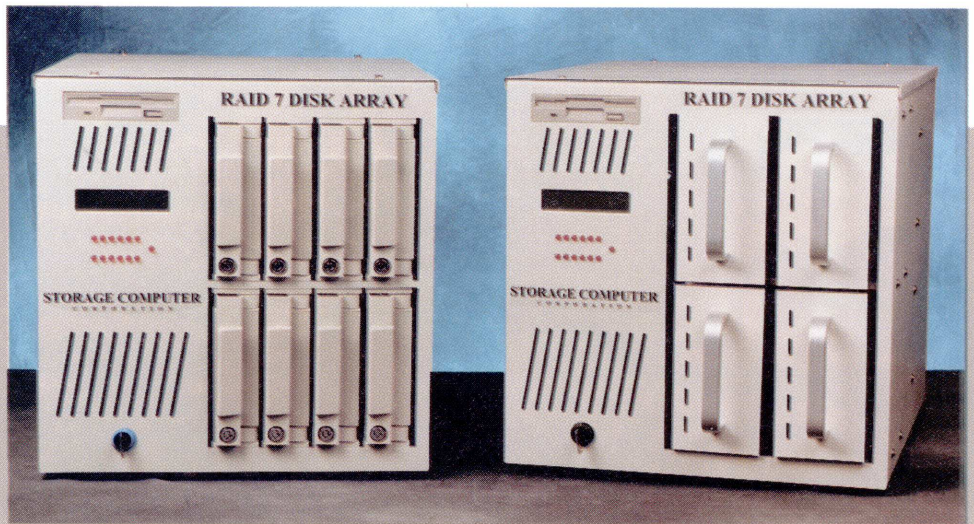
Storage Computer Corporation (StorComp) has announced delivery of what it believes is the industry's most advanced Redundant Arrays of Independent/Inexpensive Disks (RAID) storage system on the market.

StorComp's RAID 7 storage system can enable an existing computer to do the work of two, three, or even four similar computers, the company notes. It provides virtual solid state disk performance with data fault tolerance at commodity disk prices.

RAID 7 platforms feature an asynchronous hardware design with a real-time embedded operating system to control access to the disk drives and data flow to the host. It also is the first RAID architecture to implement a truly standards-based data storage system, the company notes.

At first release, StorComp RAID 7 platforms are available in desktop, integrated rack-mount, and modular (console) configurations and are designed to provide 1 to 141 GB of protected storage capacity on network file servers, UNIX workstations, and supermini and mid-range systems. Benchmark tests show that RAID 7 can help these and other systems run applications two to four times faster and still provide full data fault tolerance.

Two RAID 7 platforms can be configured with a single set of drives to create a fully fault-tolerant subsystem for mission/money critical installations. The product also incorporates open systems standards. RAID 7 features a SCSI-2 interface and installs like an ordinary SCSI disk, using the host system's standard procedures for formatting, partitioning, and mounting to a file system. The systems also include a setup program designed for simple and easy platform configuration for multiple hosts, multiple SCSI target



addresses, or to allocate capacity to separate host systems. RAID 7 also allows removing and replacing disks without disrupting service.

RAID 7 platforms are scalable, so users can extend the useful life of a host system, protect against multiple disk failures, and provide fully fault-tolerant, nonstop operation. Depending on the system configuration, users can increase storage capacity up to 141 gigabytes, expand cache memory size up to 256 megabytes, and add up to 100 more host interface channels for each storage device. Multiple RAID 7s can provide a single host channel with nearly a terabyte of storage capacity.

StorComp's RAID 7 desktop, integrated rack-mount and console platforms are available now directly from the company and through selected value-added resellers, system integrators, and distributors worldwide. Prices vary according to packaging and configuration. Desktop units start at \$15,900 and can be expanded to support 12 disks and two host interfaces. Integrated rack-mounted units start at \$19,500 and are upgradable to as many as 18 drives and four host interfaces. The console systems are separate modular rack-mountable units that can be stacked to support 48 drives and up to 12 host interfaces. For more information contact Storage Computer Corporation. Phone: (603) 880-3005; fax: (603) 889-7232.

in addition to date, day of the week, and time. While the UNIX cron utility provides only simple data- and time-based scheduling, Maestro can launch jobs automatically at the end of the month or

two weeks before Christmas, for example. Job initiation can depend on the successful completion of other jobs, the existence of needed files on any CPU in the network, operator response to a Maestro

prompt, or the availability of critical hardware or data resources.

Maestro/UX is designed to automate every step of batch mode management. It schedules and launches jobs, limits

the number of jobs executing simultaneously, integrates jobs submitted with the "at" and "batch" commands, and enforces job dependencies and restrictions across one or more CPUs and platforms. The product also provides online job tracking displays, keeps a detailed record of job execution, provides a comprehensive audit trail, logs statistics for complete reporting and analysis, controls all systems on the network from a single master console, documents job completion status, and automates recovery procedures.

This new release of Maestro runs on HP 9000 Series 700 and 800 systems with no HP 3000 required.

For further information on the above products call Unison-Tymlabs' Corporate Headquarters at (408) 245-3000.

Version B.03

SpoolMate Version B.03, Unison-Tymlabs' report distribution and management facility for MPE/iX and HP-UX, makes the following SpoolMate capabilities available for Novell networks and TCP/IP-connected printers: transferring files between HP hosts and Novell networks for printing to any host-or network-connected printer; sending output from MPE, HP-UX, and Novell to any LAN printer connected via TCP/IP Network Peripheral Interfaces such as the HP JetDirect peripheral interface, the Lantronics printer server, and the Emulex Performance Ethernet Terminal Server; and transferring spool files between MPE and HP-UX systems using any spooled or nonspooled printer on the network.

Unison-Tymlabs has also added optional support for LPD/LPR servers (the generally accepted version of the UNIX LP transmission protocol). SpoolMate has also added support for four-digit

logical device numbers to support the changes to MPE/iX version 4.0.

Session 3.2

Version 3.2 of Unison-Tymlabs' Business Session for Windows contains support for an open systems approach to PC-to-HP host networking. Session for Windows now supports the industry-standard Windows Sockets (WinSock) interface for TCP/IP communications. Windows users running Session can now connect to their HP 9000 or other UNIX-based systems using any WinSock-compliant TCP/IP protocol stack.

The product also supports drag-and-drop files to start a file transfer or run a script, improved local printing and scalable font options, and a number of widely used forms of the Xmodem, Ymodem, and Zmodem file transfer protocols.

KLA/UX Version A.01

Unison-Tymlabs' KLA/UX Version A.01 is designed to give users extended control over their CPU resources. KLA/UX features assignment of maximum processing power to priority users, groups, accounts, events, and devices; monitoring of batch queues and other system activities to set priority levels for time-critical processes and postpone or prevent other CPU-intensive system events; scheduling and allocating of CPU resources for end of month, end of year, or other recurring system activities; review of CPU usage online; and printing of custom performance reports.

KLA/UX can monitor the priority values of all the processes and automatically alter priorities of specified processes if necessary. The simplified user interface is designed to provide a quick, easy way to review and alter CPU workloads, improve online response, notify users of

potential or pending problems, and automatically stop specified processes.

KLA/UX is designed for the HP 9000 Series 800 computers running HP-UX version 8.0 or later. KLA is also available for HP 3000 systems running MPE/iX 2.1 or MPE V.

For more information on the above-mentioned products, call Unison-Tymlabs' Austin Division at (512) 478-0611.

HICOMP and Texas ISA Packaging Agreement

HICOMP America, Inc. of Fort Collins, Colorado, and Texas ISA, Ltd. of Houston, Texas, have announced the signing of a VAR agreement that will result in the packaging of HICOMP's backup and archiving software with ISA's optical drives and other storage devices.

HICOMP is a wholly owned subsidiary of HICOMP Storage Technologies headquartered in Hamburg, Germany. Texas ISA is a subsidiary of ISA Company, Ltd., of Tokyo, Japan.

ISA Company, Ltd. is a co-developer of optical drives and new jukeboxes with Mitsubishi Electrical Corporation of Japan. HICOMP Storage Technologies, GmbH, develops backup software. Both the ISA Optical Jukebox and the HICOMP Software are 100 percent compatible with all HP 9000 workstations and peripherals.

The combination of the Optical Jukebox from ISA, HICOMP's HIBACK Software, and a Serial DAT Stacker allows users to purchase a total automated network backup and archival solution from a single source. By using HIBACK to back up multiplatform workstations over the network, the ISA optical jukebox can store daily incremental and weekly backups. The optical jukebox then allows online restoration of files by

users as needed. Information can be moved offline and automatically moved to serial media such as DAT for archiving.

For more information contact HICOMP America, Inc., 419 Canyon Avenue, Suite 215, Ft. Collins, Colorado 80521-2670. Phone: (303) 224-9700, (303) 224-9702.

Electronic Forms Printing Software

Proactive Systems has announced release A03.01 of FANTASIA/UX, the electronic forms laser printing software for UNIX.

FANTASIA/UX now provides bar code printing, supporting a total of 14 different bar code standards. FANTASIA/

UX allows bar codes to be printed on any business form and handles translation of numeric digits and ASCII text into the required code standard.

When bar codes are combined with the high quality text and graphics capabilities already provided, FANTASIA/UX users can design any type of business

Client-Server Business Software

Lawson Software has announced the availability of Open Enterprise Release of Lawson Accounting, Human Resources, Distribution Management Systems, and Lawson UNIVERSE products. Open Enterprise multilevel client-server applications are available on a wide range of server platforms (including HP 9000), support multiple relational databases, and offer several client platform options.

The product's presentation manager component has been designed to recognize GUI workstation devices and character-based terminals. This allows the user organization the flexibility to implement GUIs where they make sense and still use nonintelligent workstations for intensive data entry.

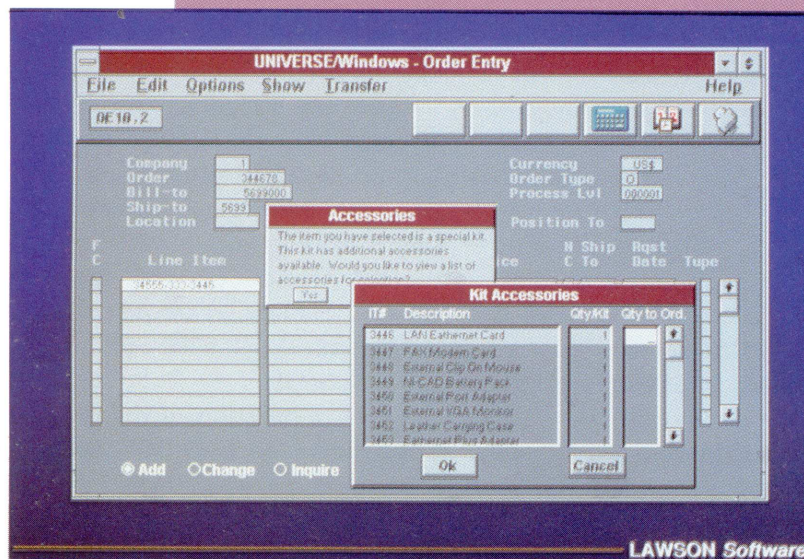
The Open Enterprise release of UNIVERSE Environmental System allows Lawson applications to be configured in several ways to support a flexible client-server model. Users of Open Enterprise Release will have several graphical user interface options including Windows, Motif, and Macintosh. The product's presentation manager is designed to support both GUI workstation devices and character-based terminals.

Lawson also incorporated many PC-like enhancements to the application screens, making them easier for end users. An easy-to-use fourth-generation language tool creates online inquiry screens and reports to extend Lawson applications and take advantage of process re-engineering.

The applications are designed to provide a comprehensive, integrated environment for managing a company's financial, capital, and human resources. The applications allow for a detailed and enterprise-wide view of the company's functions without sacrificing ease of use. The applications now have increased online inquiry and the ability to support client-server, multiple hardware, and multiple RDBMS platforms.

Applications now can be used in multiple languages through a language table resident in UNIVERSE. Open Enterprise also offers users online

currency conversion. All transactions, journal entries, invoices, purchase orders, etc. may be converted online from a foreign currency to the company's financial statements and can be translated automatically using appropriate currency rates for consolidated reporting purposes.



Lawson
Software's
UNIVERSE

form they need and print forms in high volume using HP LaserJet printers.

Other enhancements include a macro command processor, support for structured documents, an expanded font set, and an expanded font management system. FANTASIA/UX now supports 100 fonts.

FANTASIA/UX prints forms and business documents on LaserJet and compatible printers up to the HP 5000. It prints the form background, including graphics and boxes, together with form data all in one pass. FANTASIA/UX minimizes the need for pre-printed stationery. For more information contact Shelby Robert at (415) 949-9100.

New from OCS

PRIVATE 4.56

PRIVATE 4.56, now shipping, is faster and more flexible with the addition of full Native Mode operation and a variety of new features and options.

PRIVATE's Native Mode architecture has improved the logon routine, now up to one third faster. Also new in 4.56 is the Local Network Security Option. This option allows the system administrator to include a machine or node password. This prevents users who are already logged on from accessing specified resources.

The product now has 20 new configurable messages in the security edit program so the system administrator can customize any PRIVATE message to fit his or her environment.

New Job Control Words allow users to take action on more PRIVATE messages. Job Control Words create if-then statements that look for specific messages and take a user-defined action.

PRIVATE 4.56 now notifies end users whenever an invalid attempt has been made to access their account. PRIVATE also

logs this information in its security database for access by the system administrator.

Platform-Independent RAID

Falcon Systems Inc. has announced FalconRAID, a family of platform-independent Redundant Array of Inexpensive Disks (RAID) systems with hot-swappable drives and capacities as high as one terabyte.

The systems install on any UNIX workstation or server equipped to connect a SCSI or SCSI-2 device. FalconRAID's included digital controller is designed to handle all file management and disk and parity striping, presenting the system to the host as a single SCSI peripheral and making installation fast and easy.

FalconRAID systems are configured in five-bay tower cabinets hosting either 3½-inch or 5¼-inch drives. Drives of differing capacities can be mixed in towers, and multiple towers can be chained transparently for configuring varying capacities. All drive bays have hot-swappable mounts, enabling drive replacement without shutting the system off.

The systems are offered at RAID levels 1, 3, or 5. Level 1 provides up to a 40 percent increase in its disk access time, with a read or write operation that can be initiated before the previous disk access is completed.

Level 3 adds a disk redundancy security feature by establishing dedicated parity disk checks. This enables automatic, online reconstruction of any failed disk. Level 5 adds parity striping for improving disk access times for small data packets and transaction processing.

FalconRAID system prices vary according to disk capacity and RAID level. A one-tower, 7.5 GB Level 1 system costs \$29,000, complete and ready for plug-and-play

installation. Systems are available pre-staged and preformatted for HP 9000 and other systems and servers.

Falcon Systems has also introduced the DV350 "Darth Vader" disk array subsystem, an eight-bay, 3½-inch drive cabinet with fixtures for standard 19-inch rack mounting. For maximum data security, the DV350 features dual power supplies, ventilation fans, controllers, and SCSI ports.

Users can fill the DV350's eight drive bays with drives as needed. The DV350 can be configured with four 3½-inch drives and one full-height 5¼-inch drive.

The DV350 joins another rack-mountable disk array introduced previously by Falcon, the DV525, with five 5¼-inch drive bays. The basic cabinet price of the DV350, including fans and power supplies, is \$850. Controllers are specified by the user at additional cost.

For more information contact Falcon Systems, Inc., 1417 W. North Market Blvd., Sacramento, California 95834, (800) 326-1002.

GUI for Printing Network

Holland House has announced the release of UNISPOOL/COMMANDER, a graphical user interface for network-wide printing control. Running on MS-Windows-based PCs, UNISPOOL/COMMANDER is designed to implement, monitor, and control the user's entire printing network, including all systems and print devices, from a single point. Another major benefit is that any user with an MS-Windows PC can run the program and use it as a friendly user interface for UNISPOOL.

UNISPOOL/COMMANDER displays the entire network in an icon-based diagram. A set of easy-to-use dialogue boxes can be used to configure each system for UNISPOOL and to automatically

upload the configuration file to each system across the network.

Using the network diagram, users can, depending upon their security level, zoom in on any system and request the status of links between systems, or they can zoom in on any print device and request the status of links, the device itself, and any print files waiting in the queue. Changes can also be made to system configuration, link or device states, security settings, and print file information using either the pull-down menus or the mouse.

For normal terminal and X-terminal users, Holland House is working on a menu interface for UNISPOOL, available under MS-Window, Motif, and block mode. Holland House will use a ready-made product called PANEL, produced by Delaware Computing, Belgium, and one of the company's partners in the European Software Consortium.

UNISPOOL/COMMANDER is available as one of the optional UNISPOOL modules, and prices begin at \$250 (U.S. list) per UNIX host system and \$800 (U.S. list) per MPE host system. UNISPOOL is available on MPE, HP-UX, DOMAIN, AIX, ULTRIX, and SCO-UNIX platforms. For more information contact Julie Mowinski, Holland House B.V. Phone: (+31) 4187 3000; fax: (+31) 4187 3060.

Utility for Reduced Response Times

Kelly Computer Systems announced the release of Ramdisc utility software for HP 9000, Series 300, 400, 700, and 800 systems. This advanced tool enables HP-UX systems users to speed up access to frequently used files by up to 1,000 percent, the company notes. It allows users to access data at RAM speeds versus hard disk speeds. According to the

company, Ramdisc is the first and only product of its kind in the HP 9000 environment.

Ramdisc provides an advanced method of improving disk response times on HP-UX systems by using portions of main memory as solid-state disk drives. It is a disk drive consisting of solid-state semiconductor DRAM devices and performs I/O at the highest rate physically possible. According to the company, reads and writes are instant, and an I/O takes less than one microsecond rather than 30 milliseconds. When files that cause frequent hard disk accesses are placed into Ramdisc, overall system response times are said to improve by 30 to 900 percent. Examples of the types of files where Ramdisc can make a dramatic improvement include database index files, menu systems, tables, CAD tools, library files, finite element scratch files, temporary files, and frequently called menus, macros, scripts, and programs.

All products are available for immediate delivery and are backed by a lifetime warranty and "Replacement Before Return" service program.

For more information contact Kelly Computer Systems, 139 N. Whisman Road, Mountain View, California 94043. Phone: (415) 960-1010; fax: (415) 960-3474.

Expanded Maintenance Services

Atlantic Tech Services (ATS) has expanded its Hewlett-Packard maintenance services operation to the New England area. The Boston facility is the most recent location added to meet the growing demand for third-party services. ATS specializes in computer maintenance services for Hewlett-Packard 3000, 1000, and 9000 equipment. ATS has both commercial and government accounts and

offices in selected cities nationwide.

For more information call Mr. David Mason at (800) 446-7399.

Internationally Approved 400-2,200 VA UPS

Deltec has introduced the new PowerRite Pro Uninterruptible Power System (UPS) for microprocessor-based equipment up to 2,200 VA, including personal computers, workstations, and file servers. It provides low-priced, reliable power protection from all electrical disturbances, Advanced Battery Management (ABM), and monitoring capabilities.

The new product line was developed through the cooperation of engineering teams from Deltec and parent company, Fiskars, to exceed the highest safety and performance standards in Europe, Canada, and the U.S.

The PowerRite Pro offers state-of-the-art features normally associated with larger, more expensive UPSs. It regulates voltage output within CBEMA standards without battery power. Advanced charging and monitoring optimize battery efficiency.

Other features include a 10-year prorated warranty, \$25,000 anti-pass-through guarantee, sine wave output, easy-to-understand status indicators, and computer/LAN communications. Optional Novell, 3Com, UNIX, and other LAN interface software is available.

Models start at \$449, with special pricing and promotional programs available for distributors and resellers. Models conform to UL, CSA, IEEE, FCC, ANSI, IEC, EN, VDE, SETI, SEMKO, and NSTA requirements.

For more information contact Deltec Electronics Corporation, 2727 Kurtz Street, San Diego, California 92110. Phone: (800) 854-2658. ■



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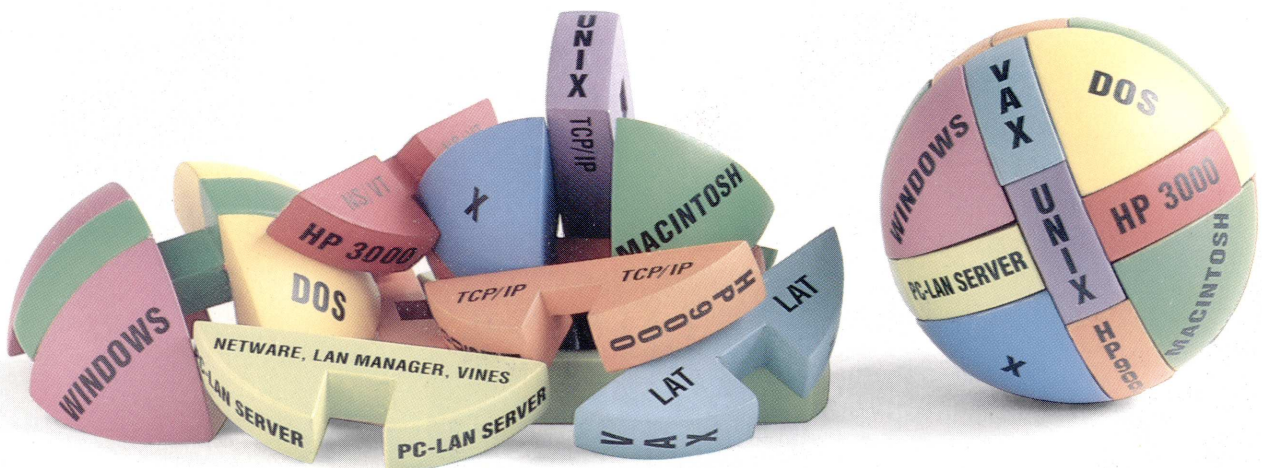
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